

STANDARD TREATMENT GUIDELINES

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DEPARTMENT OF PUBLIC HEALTH & FAMILY
WELFARE
MADHYA PRADESH

STANDARD TREATMENT GUIDELINES (2016)

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**DEPARTMENT OF PUBLIC HEALTH & FAMILY WELFARE
MADHYA PRADESH**

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Disclaimer: Any set of guidelines can provide only general suggestions for clinical practice and practitioners must use their own clinical judgment in treating and addressing the needs of each individual patient, taking into account patient's unique clinical situation. There is no representation of the appropriateness or validity of these guideline recommendations for any given patient. This manual does not intend to be either restrictive or prescriptive. Treatment guidelines are provided in good faith. Contributors and editors cannot be held responsible for errors, individual response to drugs and other consequences.

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Forward

Every public health system seeks to improve the health and well-being of people through approaches which focus on the entire population. It's priority is to reduce disparities in health status between different social groups. Access to affordable essential medicines is a vital component of an efficient health care system. In our resource-constrained environment with a high burden of disease, the value of the Standard Treatment Guidelines and Essential Drug List in ensuring affordable and equitable access to health-care should not be underestimated.

Standard Treatment Guidelines ensure consistency, and treatment efficacy for patients across demographic and geographic barriers. The guidelines provide an expert consensus, quality care, standard basis of patient monitoring for service providers and makes demand more predictable, allows pre-packs for supply managers. The guidelines focus on therapeutic integration of special programs, promote efficient use of funds by policymakers.

Health-care providers are informed about the most appropriate treatment improving the quality of care as the patients receive optimal therapy. The guidelines enable consistent and predictable treatment from all level of service providers and at all locations within the healthcare system. Consequently, drug availability or absence will not be the limiting factor with regards to the positive or negative impact on health.

The criteria for the selection of essential drugs for primary health care in madhya pradesh are based on the WHO guidelines for drawing up a State EDL. Essential medicines are selected with due regards to disease prevalence, evidence on efficacy and safety, and comparative cost.

In keeping with the objectives of the State Drug Policy the department is trying to ensure provision of essential drugs in generic form at various levels of health-care system i.e. Primary Health Centre; Community Health Centre, District Hospitals and Speciality centres on the basis of services offered and the competency of the staff at each facility.

This document is an effort to optimise the resources and provide quality of care to the population in the state. It will also minimise over and unnecessary medication. Provision of good quality generic drugs will also reduce the out-of-pocket expenses of the population at large .

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Introduction to Guidelines

This book is an attempt to give guidelines/protocols for treatment of common diseases, keeping in mind the rational use of drugs for each clinical condition. It is assumed that the patient has been fully evaluated and all co-morbidities identified. Treatment of the patient would involve a holistic approach and would require the expertise of the treating physician in formulating a treatment plan.

We describe groups of patients and make suggestions intended to apply to average patient in each group. However, patients will differ greatly in their presentation, treatment preference and capacities in their history of response to previous treatments, their family history of response to treatment, and their tolerance for different side effects; therefore, the expert's first line recommendations may not be appropriate in all circumstances; however, several alternatives have been suggested to meet the requirements. It begins at the point when the doctor has already diagnosed a patient suffering from that particular disease and has evaluated the patient to ascertain the presence of other concomitant disorders and other medical factors that may affect the diagnosis or treatment of the patient. We assume clinicians using these guidelines are familiar with assessment and diagnostic issues.

It is divided into twenty chapters. First two chapters deal with general diseases and emergencies which may be common to all specialties. The aim is to provide complete management of commonly encountered diseases and emergency cases with clear instructions for referral (when, where and how) to a higher centre with facilities for appropriate management. Rest of the chapters deal with common diseases in each specialty namely medicine, ENT, eye, skin, obstetrics and gynaecology, psychiatry, orthopaedics, surgery, paediatrics and dental. Paediatric section provides treatment of diseases specifically encountered in paediatric age group. Other diseases which are also commonly encountered in adults are also discussed in the respective section with doses for children.

The format of guidelines is such that it gives only few salient features of the disease and important diagnostic tests followed by nonpharmacological and pharmacological treatment. Nonpharmacological treatment being an important aspect has been described very clearly. Pharmacological treatment includes instructions on drug use, special precautions and warnings related to therapy. Assessment of response to therapy, key assessment indicators (signs/symptoms, investigations etc.) with the monitoring interval are also incorporated. The guidelines mention the aim of therapy and in the case of no response to the preferred treatment, step-up therapy or referral to a higher centre with appropriate facilities for care.

Drugs are selected on the basis of balanced criteria of efficacy, safety, suitability and cost. Drugs are mentioned in generic names only. Combination drugs are not included in the treatment except for some topical preparation e.g. in eye, ENT and skin preparations. These combinations were selected on the basis of appropriate ingredients and availability in the market.

Wherever drug choices are given for the treatment of a disease, they are listed in order of their preference. Where there are many equi-efficacious alternatives available, preferably only 2-3 choices are mentioned to enable flexibility in the treatment. Drug choices are demarcated by 'Or'. If several drugs are required concomitantly for treatment they are mentioned as 1, 2, 3 and so on. Only drugs with best available evidence in support are listed in the text. Use of particular drug, if not supported by good acceptable level of evidence or is obsolete but still prescribed, is not listed in the text. Drug dose is given as a range and wherever required in per kilogram dose with maximum tolerated dose. The frequency, route and special precautions are mentioned very clearly. Modification of treatment after monitoring the response is the next important step described in the pharmacotherapy. Generally, the text is given in telegraphic language and rationale for a particular choice of drug or modality of treatment is not mentioned.

If a particular treatment needed is mentioned at several places, viz. fever, shock, pain relief, in that case details are given in one section with a note 'for details see relevant section'.

We have relied on expert opinion precisely because we are asking crucial questions that are not very well answered in the literature. One thing that the history of medicine teaches us is that expert opinion at any given time can be very wrong. Accumulating research will ultimately reveal better and clearer answers. Clinicians should therefore stay abreast of the literature for developments. We will continue to revise the guidelines periodically based on new research information and on reassessment of expert opinion to keep them up-to-date.

No set of guidelines can ever improve practice if read just once. These guidelines are meant to be used in an ongoing way, since each patient's status and phases of illness will require different interventions at different times. We believe the guideline recommendations will reinforce your best judgment when you are in a familiar territory and help you with new suggestions when you are in a quandary.

Essential Drug List

Essential medicines are those that satisfy the priority health care needs of the population. They are selected with due regard to public health relevance, evidence on efficacy and safety, and comparative cost-effectiveness. Essential medicines are intended to be available within the context of functioning health systems at all times in adequate amounts, in the appropriate dosage forms, with assured quality and adequate information, and at a price the individual and the community can afford.

The implementation of the concept of essential medicines is intended to be flexible and adaptable to many different situations. Careful selection of a limited range of essential medicines results in a higher quality of care, better management of medicines (including improved quality of prescribed medicines) and more cost-effective use of health resources.

The lists of essential medicines relate closely to guidelines for clinical health care practice, which are used for the training and supervision of health professionals. Lists of essential medicines also guide the procurement and supply of medicines in the public sector, schemes that re-imburse medicine costs, medicine donations, and local medicine production.

Selection criteria

The choice of essential medicines depends on several factors, including the public health relevance, and sound and adequate data on the *efficacy, safety, suitability and comparative cost-effectiveness of available treatments*. Stability in various conditions, the need for special diagnostic or treatment facilities and pharmacokinetic properties are also considered if appropriate.

Most essential medicines should be formulated as single compounds. Fixed-ratio combination products are selected only when the combination has a proven advantage in therapeutic effect, safety or compliance over single compounds administered separately.

In cost comparisons between medicines, the cost of the total treatment, and not the unit cost only of the medicine, is considered. Cost and cost-effectiveness comparisons may be made among alternative treatments within the same therapeutic group, but generally should not be made across therapeutic categories (for example, between treatment of tuberculosis and treatment of malaria). The patent status of a medicine

is not considered in selecting medicines for the List. Other factors which are also considered include factors such as local demography and pattern of disease, treatment facilities, training and experience of the available personnel, local availability of individual pharmaceutical products, financial resources and environmental factors.

Quality of products

Priority is given to ensuring that available medicines have been made according to good manufacturing practices and are of assured quality. It is recommended that medicines be purchased from known manufacturers, their duly accredited agents or recognized international agencies known to apply high standards in selecting their suppliers.

STANDARD TREATMENT GUIDELINES

The terms standard treatment guidelines, treatment protocols, and prescribing policies are all used to indicate systematically developed statements to help practitioners or prescribers make decisions about appropriate treatments for specific clinical conditions. Treatment guidelines exist for different levels of health care, ranging from general prescribing guidelines for rural areas to detailed protocols for tertiary health care centers.

Advantages

Standard guidelines benefit health officials, supply management staff, health care providers, and patients. Their development is a good opportunity to integrate the technical advices of different disease programmes into an overall training programme. Treatment guidelines should be used as the basis for undergraduate medical and paramedical training, for in-service training, for supervision, and for medical audit to assess and compare quality of care. For Health Care Managers it provides expert consensus on most effective, economical treatment for a specific setting and gives opportunity to the health care providers to concentrate on correct diagnosis. For patients it offers and encourages adherence to treatment through consistency among prescribers, provision of most cost-effective treatments; improvement in availability of drugs and better treatment outcome.

Key features

Simplicity. The number of health problems is limited and for each health problem, a few key diagnostic criteria are listed. Drug and dosage information is clear and concise.

Credibility. Guidelines developed by the most respected clinicians in the country and revisions based on actual experience.

Use of same standard for all levels of health care. Doctors and other health care providers use the same standard treatment as it is a referral criterion which differs, and the first choice treatment for a patient depends on the patient's diagnosis and condition—not on the prescriber.

Provision of standards to drug supply. Most importantly drug supply should be matched to the recommended treatments and drugs on the list of essential drugs. **Regular updating.** As bacterial resistance patterns change or other factors alter therapeutic preferences, the standards are revised to reflect current recommendations.

RATIONAL PRESCRIBING AND PRESCRIPTION WRITING

Once a patient with a clinical problem has been evaluated and a diagnosis has been reached, the practitioner can often select from a variety of therapeutic approaches. Medication, surgery, psychiatric treatment, physical therapy, health education, counseling, further consultation, and no therapy are some of the options available. Of these options, drug therapy is by far most commonly chosen. Drugs should only be prescribed when they are necessary, and in all cases the benefit of administering the medicine should be considered in relation to the risks involved. Bad prescribing habits lead to ineffective and unsafe treatment, exacerbation or prolongation of illness, distress and harm to the patient, and higher cost. Like any other process in medicine, writing a prescription should be based on a series of rational steps. The following steps will help to remind prescriber of the rational approach to therapeutics:

1. **Define the patient's problem.** Whenever possible, making the right diagnosis based on integrating many pieces of information: the complaint as described by the patient; a detailed history; physical examination; laboratory tests; X-rays and other investigations. This will help in rational prescribing, always bearing in mind that diseases are evolutionary processes.
2. **Specify the therapeutic objective.** Doctors must clearly state their therapeutic objectives based on the pathophysiology underlying the clinical situation. Very often physicians select more than one therapeutic goal for each patient.
3. **Selecting therapeutic strategies.** The selected strategy should be agreed with the patient; this agreement on outcome, and how it may be achieved, is termed concordance. The selected treatment can be non-pharmacological and/or pharmacological; it also needs to take into account the total cost of all therapeutic options.

Non-pharmacological treatment

It is very important to bear in mind that the patient does not always need a drug for treatment of

the condition. Very often, health problems can be resolved by a change in lifestyle or diet, use of physiotherapy or exercise, provision of adequate psychological support, and other non-pharmacological treatments; these have the same importance as a prescription drug and instructions must be written, explained and monitored in the same way.

Pharmacological treatment

1. **Selecting the correct group of drug.** Knowledge about the pathophysiology involved in the clinical situation of each patient and the pharmacodynamics of the chosen group of drugs, are two of the fundamental principles for rational therapeutics.
2. **Selecting the drug from the chosen group.** The selection process must consider benefit/risk/cost information. This step is based on evidence about maximal clinical benefit of the drug for a given indication (efficacy) with the minimum production of adverse effects (safety). In cost comparisons between drugs, the cost of the total treatment and not the unit cost of the drug only must be considered.
3. **Verifying the suitability of the chosen pharmaceutical treatment for each patient.** The prescriber must check whether the active substance chosen, its dosage form, standard dosage schedule and standard duration of treatment are suitable for each patient. Drug treatment should be individualized to the needs of each patient.
4. **Prescription writing.** The prescription is the link between the prescriber, the pharmacist (or dispenser) and the patient and it is a medicolegal document. While a prescription can be written on any piece of paper (as long as all of the legal elements are present), it usually takes a specific form. This item is covered in more detail in the following section.
5. **Giving information, instructions and warning.** This step is important to ensure patient adherence and is covered in detail in the following section.
6. **Monitoring treatment.** Evaluation of the follow up and the outcome of treatment allow the stopping of it (if the patient's problem is solved) or to reformulate it when necessary. This step gives rise to important information about the effects of drugs contributing to building up the body of knowledge of pharmacovigilance, needed to promote the rational use of drugs.

PRESCRIPTION WRITING

A prescription is an instruction from a prescriber to a dispenser. All prescriptions orders should be legible, unambiguous, dated (and time in the case of chart order), and signed clearly for optimal communication between prescriber, pharmacist, and nurse. A good prescription or chart order should contain sufficient information to permit the pharmacist or nurse to discover possible errors before the drug is dispensed or administered. The prescriber is not always a doctor but can also be a paramedical worker, such as a medical assistant, a midwife or a nurse. The dispenser is not always a pharmacist, but can be a pharmacy technician, an assistant or a nurse. The following guidelines will help to ensure that prescriptions are correctly interpreted and leave no doubt about the intention of the prescriber.

Prescription form

The most important requirement is that the prescription be clear. It should be legible and indicate precisely what should be given. The local language is preferred.

The following details should be shown on the form:

The prescriber's name, address and telephone number. This will allow either the patient or the dispenser to contact the prescriber for any clarification or potential problem with the prescription.

Date of the prescription. Name, form, strength of the drug and duration of treatment. The International Nonproprietary name of the drug should always be used. If there is a specific reason

to prescribe a special brand, the trade name can be added. The pharmaceutical form (for example

‘tablet’, ‘oral solution’, ‘eye ointment’) should also be stated.

The strength of the drug should be stated in standard units using abbreviations that are consistent with the System Internationale (SI). ‘Microgram’ and ‘nanogram’ should not be abbreviated since abbreviated form (“ μg ”) is very easily misread as “mg”, a 1000-fold overdose. Also, ‘units’ should not be abbreviated. Avoid decimals whenever possible. If unavoidable, a zero should be written in front of the decimal point.

Specific areas for filling in details about the patient including name, address and age.

Directions

Although directions for use are no longer written in Latin, many Latin apothecary abbreviations are still in use (and some others included below). Knowledge of these abbreviations is essential for the dispensing pharmacist and often useful for the prescriber.

Abbreviation	Explanation	Abbreviation	Explanation
Ac	before	qd	every day
Bid	twice a day	qh, q1h	every hour
Dil	dilute	qid	four times a day
Disp, dis	dispense	Qs	sufficient quantity
Gr	grain	Rx	Take
Gtt	drops	sos	if needed
Hs	at bedtime	stat	at once
OD	right eye	Tbsp, T	tablespoon (always write out
Prn	once a day	tip	(do not use) “15 ml”)
Q	when needed	tsp	three times a day
Qam, om	every morning	U	teaspoon (always write out
			“5 ml”)
			units (always write out “units”)

The abbreviation “OD” should be used (if at all) only to mean “the right eye”; it has been used for “every day” and has caused inappropriate administration of drugs into the eye. Acronyms such as ASA (aspirin), 5-ASA (5-Aminosalicylic acid), PCM (paracetamol), CPM (chlorpheniramine), CPZ (chlorpromazine) etc., should not be used; drug names should be written out. Unclear handwriting can be lethal when drugs with similar names especially brand names but very different effects are available e.g., Daonil, Duodil and Diovol. In this situation, errors are best avoided by noting the indication for the drug in the body of the prescription e.g., “Daonil (Glibenclamide), for diabetes”.

Directions specifying the route, dose and frequency should be clear and explicit; use of phrases such as ‘take as directed’ or ‘take as before’ should be avoided.

For preparations which are to be taken on an ‘as required’ basis, the minimum dose interval should be stated together with, where relevant, the maximum daily dose. It is good practice to qualify such prescriptions with the purpose of the medication (for example ‘every 6 hours as required for pain’, or ‘at night as required to sleep’).

It is a good practice to explain the directions to the patient; these directions will then be reinforced by the label on the medicinal product and possibly by appropriate counseling by the dispenser.

Quantity to be dispensed

The quantity of the medicinal product to be supplied should be stated such that it is not confused

with either the strength of the product or the dosage directions. Alternatively, the length of the treatment course may be stated (for example 'for 5 days'). Whenever possible, the quantity should be adjusted to match the pack sizes available.

For liquid preparations, the quantity should be stated in milliliters (abbreviated as 'ml') or liters (abbreviated as 'L', since the letter 'l' could be confused with the figure '1').

Narcotics and controlled substances

The prescribing of a medicinal product that is liable to abuse requires special attention and may be subject to specific statutory requirements. Practitioners may need to be authorized to prescribe controlled substances; in such cases it might be necessary to indicate details of the authority on the prescription.

In particular, the strength, directions and the quantity of the controlled substance to be dispensed should be stated clearly, with all quantities written in words as well as in figures to prevent alteration. Other details such as patient particulars and date should also be filled in carefully to avoid alteration.

Abbreviations

ABG	arterial blood gas	LFT	liver function test
AFB	acid-fast bacilli	MCH	maternal-child health
AFP	acute flaccid paralysis	MTP	medical termination of Pregnancy
APH	antepartum haemorrhage	Mo/mth	month
ASOM	acute suppurative otitis Media	NSAIDs	nonsteroidal anti- inflammatory drugs
BP	blood pressure	OCD	obsessive compulsive Disorder
CBC	complete blood count	ORS	oral rehydration salts
CCF	congestive cardiac failure	ORT	oral rehydration therapy
CNS	central nervous system	PEEP	peak end expiratory Pressure
COAD	chronic obstructive airway Diseases	PCR	polymerase chain reaction
CPAP	continuous positive airway Pressure	PCWP	pulmonary capillary wedge pressure
CPR	Cardiopulmonary Resuscitation	PEFR	peak expiratory flow rate
CSF	cerebrospinal fluid	PFT	pulmonary function test
CSOM	chronic suppurative otitis Media	PID	pelvic inflammatory Disease
CVP	central venous pressure	PPH	postpartum haemorrhage
DUB	dysfunctional uterine Bleeding	PMS	premenstrual syndrome
EEG	Electroencephalogram	PUO	pyrexia of unknown origin
ERCP	Endoscopic retrograde cholangio-Pancreatography	RAP	recurrent abdominal pain
FNAC	fine needle aspiration Cytology	RBBB	right bundal branch block
GERD	gastroesophageal reflux Disease	RBC	red blood cell
GIT	gastrointestinal tract	RR	Species
Hct	Haematocrit	STD	sexually transmitted Disease
HR	heart rate	USG	Ultrasonogram
INR	international normalized Ratio	WBC	white blood cells
JVP	jugular venous pressure	Wt	Weight
KFT	kidney function test		
Units		Routes	
µg/mcg	microgram	IM	intramuscular
g	Gram	IV	intravenous
IU	international units	PO	per oral
kg	kilogram	PR	per rectum
mg	milligram	PV	pervaginum
		SC	subcutaneous

CHAPTER 1

COMMON DISEASES

FEVER

Fever is elevation of body temperature & may be continuous, intermittent or remittent. Oral temperature for healthy adults is $36.8 \pm 0.4^{\circ}\text{C}$.

Fever In Children

Fever in children is defined as a rectal temperature of $>38^{\circ}\text{C}$ (100.4°F), oral temperature of $>37.8^{\circ}\text{C}$ (100°F) or an axillary temperature of $>37.2^{\circ}\text{C}$ (99°F).

Hyperpyrexia

Fever above 41.5°C (106.7°F) is called hyperpyrexia and needs aggressive antipyretic therapy.

CLINICAL FEATURES

Generalized symptoms: Myalgias, arthralgias, anorexia, somnolence, chills, sweats, rigors, change in mental status, rash.

Diagnostic tests

- Complete haemogram with ESR,
- Peripheral blood smear for malarial parasite,
- Urine analysis including urine culture.
- Widal test
- X-ray chest (If history of fever is > 2 weeks)

Any abnormal fluid collection should be sampled.

Treatment

Routine use of antipyretics in low-grade fever is not justified as it may mask important clinical indications

Nonpharmacological

Hydrotherapy with tepid water, rest and plenty of oral fluids.

Pharmacological

In children– Tab/syp **Paracetamol** 15 mg/kg/dose, dose can be repeated at 4 hourly interval (Paracetamol reduces fever by $1-2^{\circ}\text{C}$ within 2 hours).

(**Caution:** IV paracetamol is NOT recommended in children with age < 6 months and < 5 kg weight)

Or

Tab/syp **Ibuprofen** 10 mg/kg/dose, dose can be repeated at 8 hourly intervals. (Note: Efficacy is similar to paracetamol. Effect lasts for 6-8 hours as compared to

4-6 hours for paracetamol).

Aspirin should not be used in a febrile child due to risk of Reye's syndrome.

Various combinations of antipyretics should not be used.

In Adults— Tab. Paracetamol 500-1000 mg (max 4 g in 24 hours) 6-8 hourly.

(Caution: Reduce dose in frail elderly, adults weighing <50 kg and those at risk of hepatotoxicity)

Or

Tab. Ibuprofen 400-600 mg 8 hourly.

Specific.

Antibiotics/antimalarials depending upon the cause suggested by clinical and laboratory evaluation.

References

1. Alterations in Body Temperature. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp 143-170.
2. Physiological Changes in Infected Patients. In: Oxford Textbook of Medicine. Warrell DA, Cox TM, Firth JD, Benz EJ Jr (eds), 4th Edition, Oxford University Press, 2003; pp 1.289-1.292.

FEVER OF UNKNOWN ORIGIN (FUO)

FUO is defined as the presence of fever of 38.3°C (>101°F) or more recorded on several occasions, evolving for at least 3 weeks with no diagnosis reached even after one week of relevant and intelligent investigations.

Diagnosis

No single algorithmic approach to diagnosis can be recommended for all patients of FUO and diagnostic approach needs to be individualized.

Investigations to be done in every patient with prolonged fever -

- Complete haemogram including peripheral blood smear for malarial parasite
- Liver function tests,
- Tuberculin test
- X-ray chest

Other investigations which are often helpful include

- Tests related to collagen vascular disease
- Ultrasonography of abdomen (to localize intra-abdominal foci of infections)
- Contrast enhanced computed tomography (CECT) of chest and abdomen (for mediastinal lymph nodes and parenchymal lung abnormalities not seen on conventional chest X-ray)
- FNAC/biopsy (if any abnormal or doubtful lesion is detected).

Treatment

Treatment will be based on the specific cause of fever. Sometimes evaluation may need discontinuation of all drugs being taken by the patient to rule out drug fever as the cause of FUO.

Symptomatic treatment for fever (for details see section on fever). Sponging with lukewarm water may be done, if fever produces discomfort. The emphasis in patients with classic FUO is on continued observation and examination.

If on the basis of clinical evaluation and inability to reach a definitive diagnosis, a therapeutic trial is started, the following principles must be kept in mind:

- Give only one set of trial at a given time.
- The doses of drugs and period of therapeutic trial must be adequate.
- The patient must be followed closely for response.

The ability of glucocorticoids and NSAIDs to mask fever while permitting the spread of infection dictates that their use should be avoided unless infection has been largely ruled out.

References

1. Fever of Unknown Origin. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; 158-164.
2. Facility Based IMNCI (F-IMNCI) Participants Manual. WHO, UNICEF, and Ministry of Health & Family Welfare, Government of India, 2009.
3. Fever of Unknown Origin. In API Textbook of Medicine. Munjal YP (ed), 9th edition, JP Brothers, India, pp 42-46.

ANAEMIA

Definition

Anaemia is defined as a low haemoglobin level (adult males <13 g/dl; adult females <12 g/dl; pregnant women, <11 g/dl) or reduced RBC count or both. The common causes of anaemia in India are:

- Reduced production due to deficiency of iron, folic acid, or vitamin B₁₂; or an ineffective erythropoiesis secondary to many causes (anaemia of chronic disease, secondary to infections and inflammation, endocrinal disorders, primary bone marrow disorders like infiltration or hypoplasia).
- Blood loss (which also leads to iron deficiency).
- Increased destruction of RBCs (haemolysis due to many causes of which, a In case of associated leucocyte and platelet abnormalities or if anaemia does not respond to therapy in 4 weeks despite correcting the apparent cause, a bone marrow examination by aspiration/biopsy should be performed.

Diagnosis

Investigations to be done in a suspected case of anaemia are -

- Complete Blood picture
- Peripheral blood smear for anaemia typing & for malarial parasite.
- Stool examination for ova and cysts of helminths.

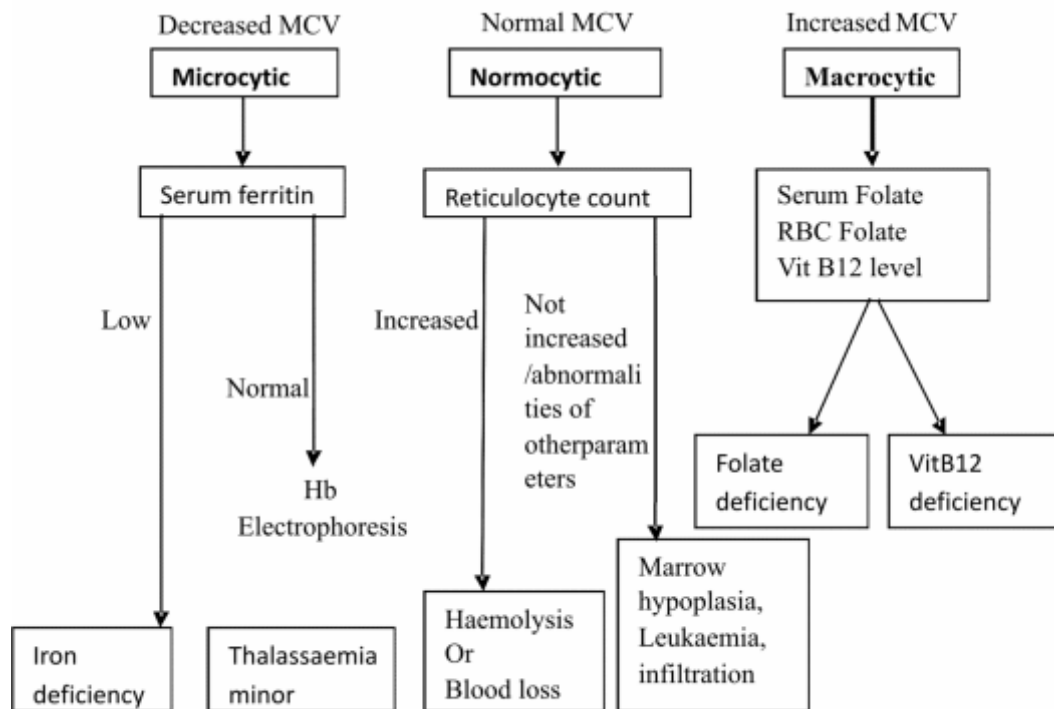


Fig. 1.1. Aetiologies for anaemia on the basis of MCV

Treatment

Consider admission if possible in malignancy or infiltrative disorder; Hb <6 g/dl (including iron deficiency); hemolysis. Transfusion where possible should be deferred until a definitive diagnosis is made.

Iron deficiency anaemia

- Treat the underlying cause: Menorrhagia in women, gastrointestinal blood loss in all age groups including hookworm infestation, dietary deficiency, rarely malabsorption.
- Tab. Ferrous sulfate 200 mg 3 times a day. Reduce the dose as haemoglobin rises to over 10 g/dl. Once haemoglobin is normal, continue with 1 tablet daily for at least three months. Other preparations include ferrous fumarate and ferrous gluconate.
- Iron supplementation given to all pregnant and lactating women -Daily oral administration of 100 mg elemental iron + 500 µg folic acid

The rate of rise of haemoglobin should be 1 g/dl per week. If this does not occur, consider ongoing blood loss, noncompliance, and associated haemoglobinopathy like thalassaemia, carrier status, malabsorption, or an incorrect diagnosis.

Parenteral iron does not lead to a faster rise in haemoglobin. It is indicated in the following situations:

- (i) Intolerance to oral iron
- (ii) In late pregnancy to ensure that foetal stores of iron are replenished rapidly.

- (iii) If ongoing blood loss exceeds the capacity to absorb oral iron.
- (iv) In noncompliant patient
- (v) Malabsorption of iron.

Administration of **Iron sucrose** intra-venously is based on total iron deficit calculated as

Total dose in mg = Body weight in Kg x (Target Hb - Actual Hb) x 2.4 + depot iron

100mg(5ml) is diluted in a maximum of 100 ml of 0.9% saline and given over 30 minutes.

(**Caution:** There is danger of anaphylactoid reactions; hence facilities to manage these should be readily available).

(See also anaemia in pregnancy and anaemia in paediatric section in Chapters 15 and 19).

Folic acid deficiency

1. Treat the cause: Dietary deficiency, increased requirement as in pregnancy and children, haemolytic anaemia.
2. Tab. Folic acid 5 mg daily. This dose is adequate even in malabsorption syndrome.

Vitamin B12 deficiency

1. Treat the cause: Dietary deficiency in vegetarians and pernicious anaemia. Although uncommon, it is also under diagnosed due to lack of facilities.
2. Tab. Vitamin B12 500 mcg thrice in a day until recovery, then 500-1000 mcg once in a day as in haematinic tablets.

Or

Inj. Vitamin B12 1000 mcg IM, one injection on alternate days for total 5 injections, then once a week for 5 weeks, then once in 3 to 6 months will be adequate for most patients.

Note: Oral vitamin B12 is indicated only in dietary deficiency states, and not in pernicious anaemia.

Reference

Anaemia and Polycythaemia. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012, pp. 448-456.

DIZZINESS AND VERTIGO

Dizziness is classified in three categories:

- (1) fainting (syncope and presyncopal symptoms)
- (2) vertigo
- (3) miscellaneous head sensation.

Common causes of vertigo include benign paroxysmal positional vertigo (BPPV), vestibular neuronitis, chronic suppurative otitis media, Meniere's disease, cervical spondylosis, drug-induced vertigo due to administration of aminoglycosides, furosemide, etc. systemic problems e.g. long-standing diabetes, hypertension, psychosomatic, idiopathic.

Treatment of Vertigo

Nonpharmacological

Reassure the patient and in cases where positional vertigo cannot be ruled out, advise the patient to take complete rest with minimal movements only.

Pharmacological

Tab. Cinnarizine 25 mg three times a day till resolution of symptoms.

Or

Tab. Betahistine 8 mg three times a day.

Or

Tab. Prochlorperazine 25 mg three times a day.

If patient has acute, severe nausea and vomiting:

Inj. Prochlorperazine 25 mg by deep IM injection stat, may be repeated after eight hours, if required.

If there is no response to medical treatment:

Refer to ENT specialist for Canthrene-Cooksey exercises. These are special exercises which facilitate the process of adaptation of the vestibule.

Refer patients with Meniere's disease for surgery to eliminate the offending labyrinth.

Reference

1. Vertigo. In: Scott Brown's Otolaryngology. Boothby JB (ed), 6th Edition, Vol. 3, 1997.

JAUNDICE

Jaundice is defined as yellow discoloration of skin, sclera and tissues caused by increased levels of circulating bilirubin.

Common causes–

- Acute viral hepatitis,
- Alcoholic hepatitis,
- Chronic hepatitis/cirrhosis,
- Gallstones
- Malignancy of gallbladder/ pancreas or extra-hepatic biliary system.
- Chronic haemolytic anaemias

Investigations

- Complete Blood Picture
- Liver function tests (LFTs),
- Viral markers,
- Ultrasound examination of liver and biliary tract

Treatment of acute viral hepatitis is detailed below.

ACUTE VIRAL HEPATITIS

Acute viral hepatitis is caused by hepatitis virus A& E (faeco-oral transmission) or B&C (parenteral transmission).

Clinical Features

- **Phase I** – Viral replication phase – Patient asymptomatic but lab studies demonstrate

serological & enzyme markers of hepatitis.

- **Phase II** - Prodromal phase -nausea, vomiting, anorexia, alteration in taste,malaise, fatigue, arthralgia, pruritus (known as viral syndrome) fever, dull aching pain in upper right abdomen .
- **Phase III** - Icteric phase -appearance of jaundice in 3-7 days of onset associated with improvement in nausea and return of appetite. Patients note dark urine, pale coloured stool, right upper quadrant pain with hepatomegaly.
- **Phase IV** - Convalescent phase, when jaundice gradually settles.

Diagnosis

- Serum Bilirubin
- IgM antibodies to different viruses (A, E and B) or detection of HCV RNA.
- Elevated ALT, AST, INR.

Treatment

Nonpharmacological

Adequate intake of fluids should be maintained.

Take normal diet (fat restriction or giving high carbohydrate has no advantage).

Indications for hospitalization are—

- severe prodromal symptoms causing dehydration,
- presence of early signs of hepatic encephalopathy (e.g. altered sensorium, disturbed sleep pattern, flapping tremors),
- decreased liver span on examination.

Pharmacological

If patient has severe nausea or vomiting.

1. Tab. Domperidone 10 mg as and when required (maximum 3 times a day).

Or

Tab. Mosapride 5 mg as and when required (maximum 3 times a day).

Or

Inj. Metoclopramide 10 mg 3 times a day IM or IV.

2. IV fluids as required in case of uncontrolled nausea or vomiting.

References

1. Acute Viral Hepatitis. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp 2537-2557.
2. Jaundice. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp 324-329
3. Acute Viral Hepatitis. In: The Silent Disease Facts and Treatment Guidelines National Centre for Disease Control 22 DGHS Ministry of Health and family welfare Govt of India.

TUBERCULOSIS

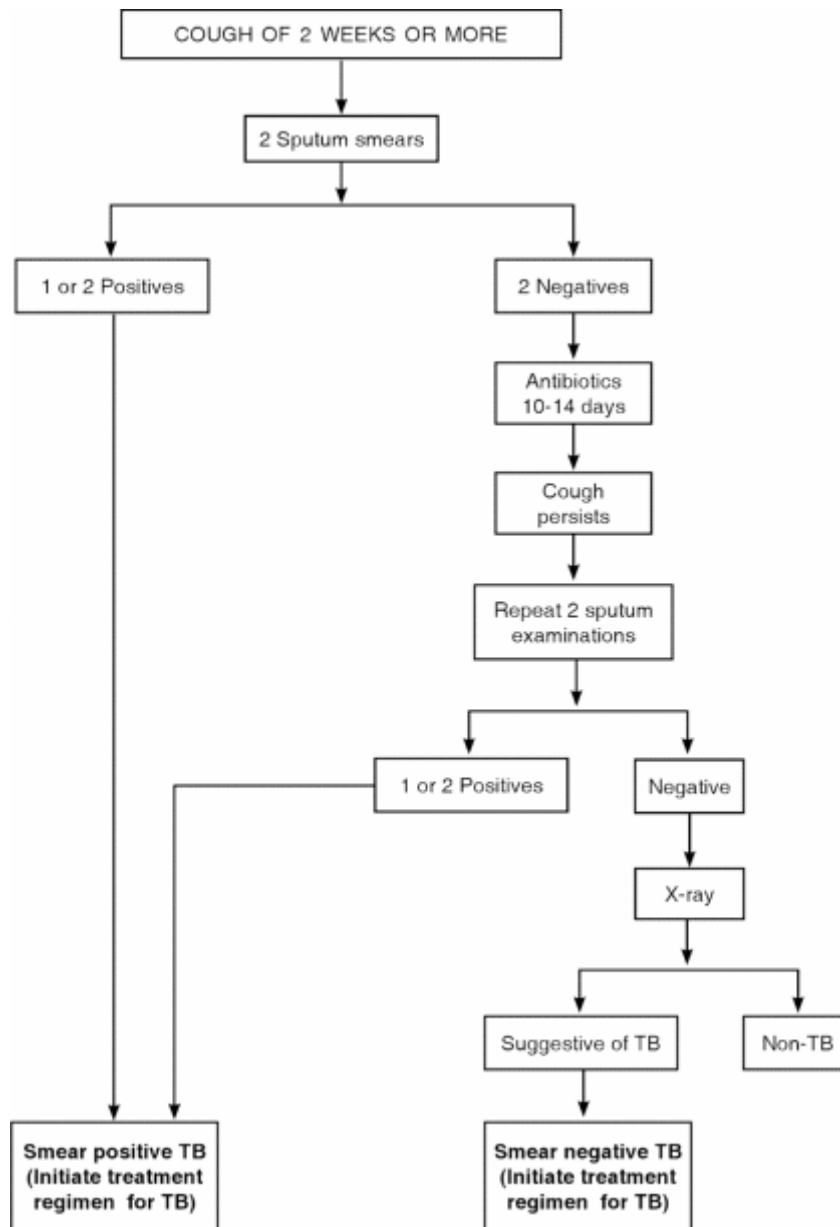
Tuberculosis is caused by *Mycobacterium tuberculosis*, and affects the lungs most commonly. Tubercular lymphadenopathy is the commonest form of extrapulmonary tuberculosis.

Clinical Features

- Pulmonary TB (75-80%)- fever, malaise, chronic cough with sputum production, anorexia ,weight loss, haemoptysis .Pleural effusion in 20%.
- Extrapulmonary tuberculosis(15%)–Nonspecific unintentional weight loss (>1.5 kg per month) ,night sweats and fever for >2 weeks and other symptoms depend upon site or organ affected..
- Both in 5%. Extra Pulmonary TB and both in 20%.
- Abdominal tuberculosis(3%)- ascites, chronic abdominal pain, diarrhoea, recurrent subacute intestinal obstruction, etc.
- CNS tuberculosis - irritability, headache, vomiting, chronic meningitis, seizures or focal neurological deficits, altered sensorium.
- Skeletal tuberculosis(10%)- Pott's spine, tuberculous osteomyelitis, monoarticular arthritis.
- Tubercular constrictive pericarditis - oedema/ascites.
- Symptoms of genitourinary TB - tubovarian masses, secondary amenorrhoea in women, chronic epididymo-orchitis in men and painless haematuria in both the sexes.
- Childhood tuberculosis - history of chronic illness that includes cough and fever, weight loss or failure to thrive, an inability to return to normal health after measles or whooping cough.Tubercular meningitis seen in 5%.
- Genito-urinary tuberculosis seen in 9%.
- Miliary TB in 8%.
- Others 10%.

Diagnosis

- Demonstration of AFB on smear or culture of the sputum or bronchial secretions.
- Chest radiograph localizes the site of pathology(no pathognomonic radiological signs of tuberculosis)
- FNAC (extrapulmonary tuberculosis)
- Fluid for cytology, biochemical analysis and smear examination- caseous granuloma with presence of AFB in the tissue,
- Ultrasonography and radiological examination of the system involved



Diagnosis –(Fig. 1.2. Diagnostic algorithm for TB in adults)

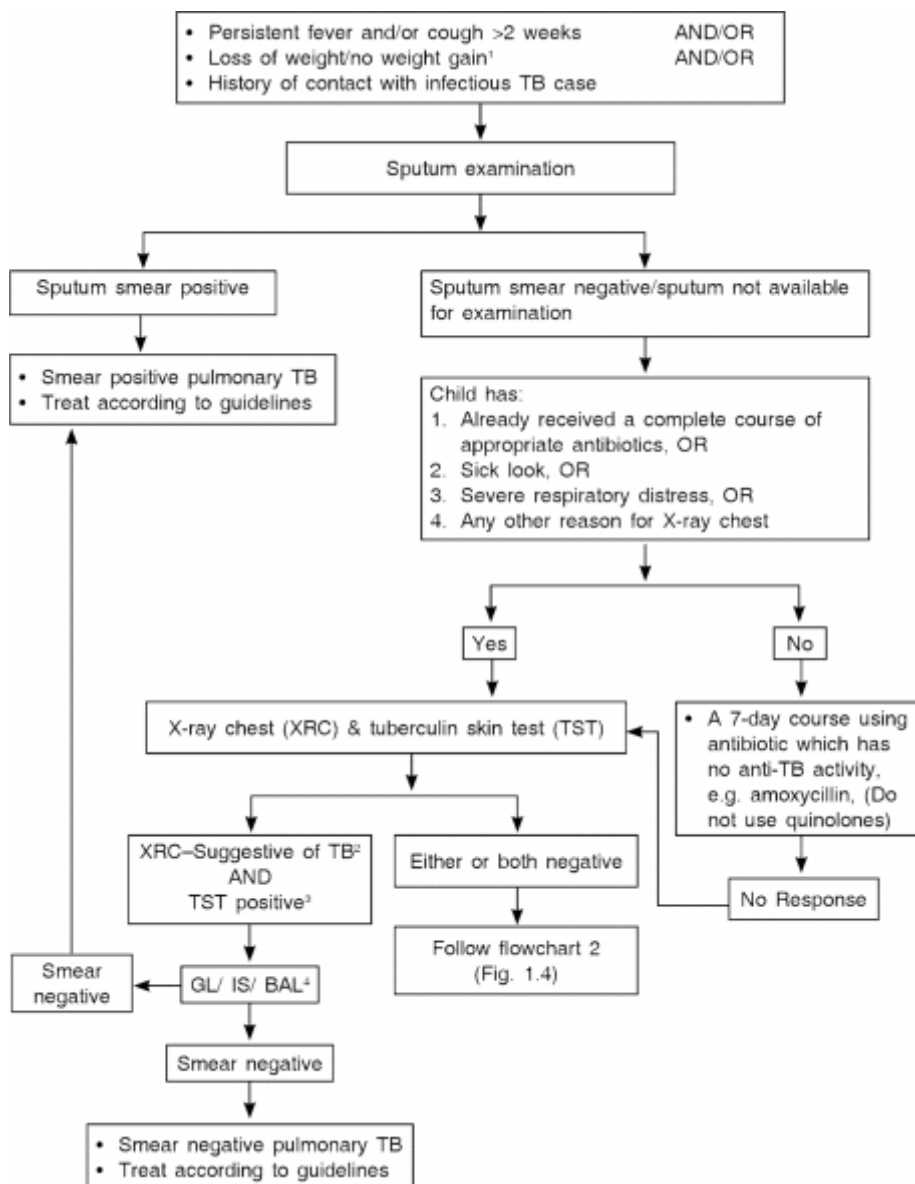


Fig. 1.3. Diagnostic algorithm for TB in children

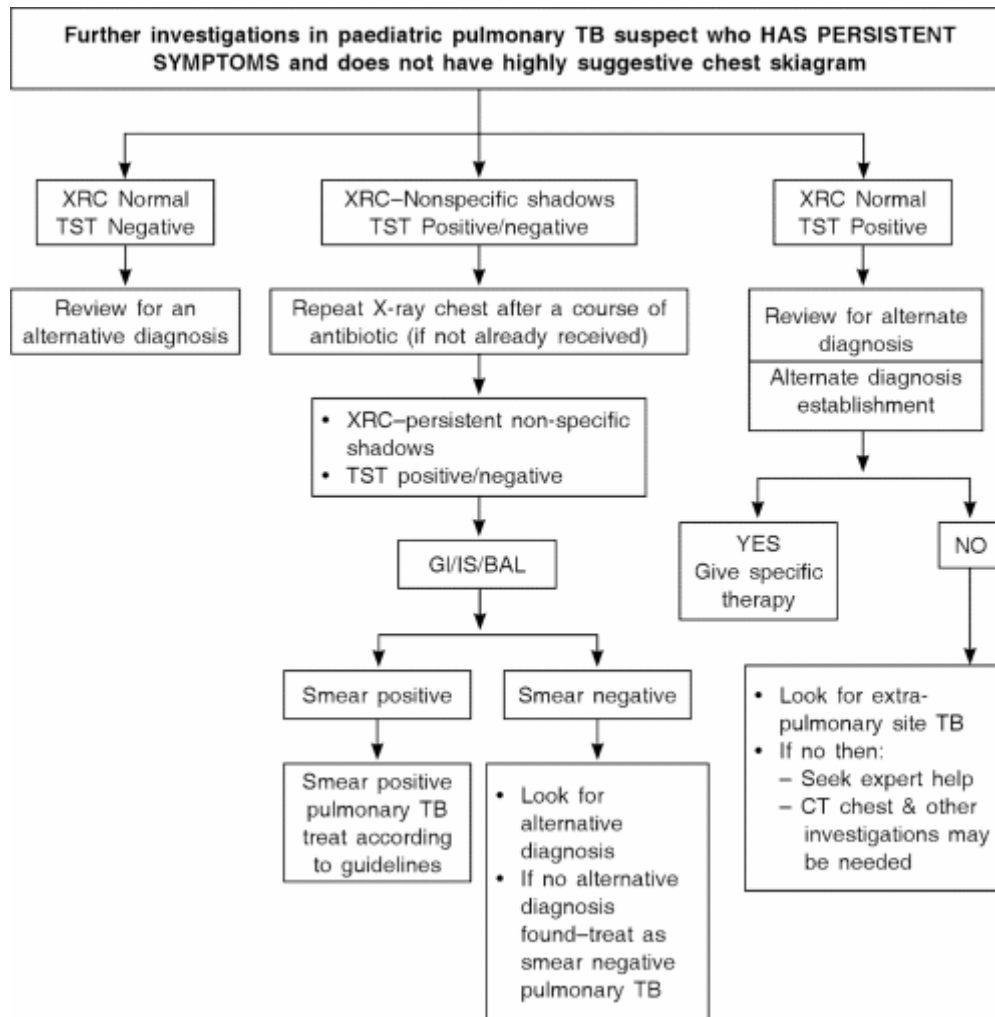


Fig. 1.4. Further investigations for TB in children who HAVE PERSISTENT SYMPTOMS and do not have highly suggestive chest skiagram

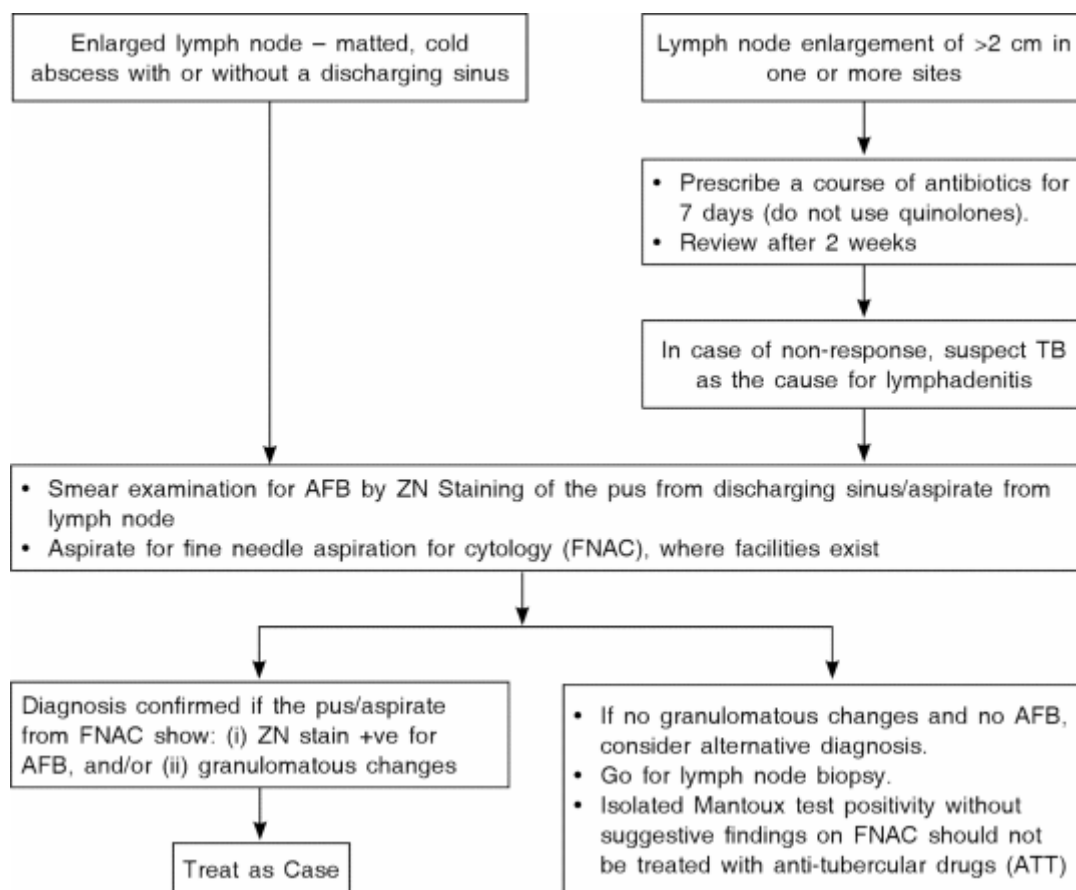


Fig. 1.5. Diagnostic algorithm for diagnosis of tubercular lymphadenitis.

Once a decision to treat tuberculosis has been taken, it is important to define and document the disease in order to prescribe the correct therapy and for the purpose of reporting (Table 1.6)

Table 1.6. Defining and documentation of TB

Case definitions	Type of cases	Treatment outcomes
Smear positive pulmonary TB (PTB) TB in a patient with at least two initial sputum smear examinations (direct smear microscopy) positive for AFB, Or: TB in a patient with one sputum examination positive for AFB and radiographic abnormalities consistent with active pulmonary TB as determined by the treating	New case A patient who has never taken treatment for TB or has taken ATT for less than 1 month. Relapse A patient declared cured of TB by a physician, but who reports back to the health service and is found to be bacteriologically positive. Treatment-after-	Cured An initially smear-positive patient, who has completed the treatment and has negative sputum smears on at least 2 occasions (one of which is at completion of treatment). Treatment completed A sputum smear positive case who has completed the treatment, with

Case definitions	Type of cases	Treatment outcomes
<p>medical officer (MO).</p> <p>Or: TB in a patient with one sputum specimen positive for AFB and culture positive for M.tuberculosis.</p> <p>Smear negative pulmonary tuberculosis</p> <p>TB in a patient with symptomssuggestive of TB with at least 3sputum examinations negative for AFB, and radiographic abnormalities consistent with active pulmonary TB as determined by an MO, followedby a decision to treat the patient with a full course of anti-tubercular therapy (ATT),</p> <p>Or: Diagnosis based on positive culture but existence of negative AFB sputum examinations.</p> <p>Extrapulmonary tuberculosis (EPTB)</p> <p>TB of organs other than the lungs, such as the pleura (TB pleurisy), lymph nodes, abdomen,genitourinary tract, skin, joints and bones, tubercular meningitis, tuberculoma of the brain, etc. The diagnosis should be based on one culture-positive specimen for an extra-pulmonary site, or histological evidence, or strong clinical evidence consistent with active extrapulmonary TB, followed by MO's decision to treat with a full course of anti-TB therapy.A patient diagnosed with both pulmonary and extrapulmonary TB should be classified as a case of pulmonary TB. Pleurisy is classified as an extrapulmonary TB.</p>	<p>Default</p> <p>A patient who received ATT for one month or more from any source and who returns to treatment after having defaulted,i.e., not taken ATTconsecutively for two months or more and found to be smear positive.</p> <p>Treatment failure</p> <p>A smear-positive patient,who continues to be smear-positive at 5 months or more after starting treatment. The failure also includes a patient who was initially smear-negative but becomes smear-positive during treatment.</p> <p>Chronic case</p> <p>A patient who remains smear-positive after completing treatment regimen for previously treated but not initiated on MDR-TB treatment..</p> <p>'Other' case</p> <p>Includes patients who do not fit into the above-mentioned categories.The reasons for putting a patient in this category must be specified.</p> <p>Treatment Outcome</p> <p>Cured</p> <p>Initially smear-positive who has completed treatment and had negative sputum smears, on at least two occasions, one of which was at completion of treatment.</p> <p>Treatment completed</p> <p>Sputum smear-positive case who has completed</p>	<p>negativesmears at the end of intensivephase but none at the end of treatment.</p> <p>Or: A sputum smear-negativesmears at the end of intensivephase but none at the end of treatment.</p> <p>Or: An extrapulmonary TBpatient who has receiveda full course of treatmentand has not become smear-positive during or at the end of treatment.</p> <p>Died</p> <p>A patient who died during treatment, regardless of the cause.</p> <p>Failure</p> <p>A smear-positive patient, who continues to be smear positive at 5 months or more after starting treatment. The failure also includes a patient who was initially smear-negative but becomes smear-positive during treatment.</p> <p>Defaulted</p> <p>A patient who, at any time after registration, has not taken ATT for two months or more consecutively.</p> <p>Transferred out</p> <p>A patient has been transferred to another tuberculosis unit/ district and his/her treatment results are not known.</p> <p>Switched over to MDR –TB treatment</p> <p>A patient who has been diagnosed as having MDR-TB by an RNTCP- MDR-TB Accredited lab prior to being declared as “failure” and is placed on MDR treatment.</p>

Intermittent short course chemotherapy given under direct observation as advocated in the RNTCP (Tables 1.7 & 1.8).

Table 1.7. RNTCP treatment regimen in adults

Treatment groups	Type of patient	Regimen ¹	
		Intensive phase (IP)	Continuation phase (CP)
New*	Sputum smear-positive Sputum smear-negative Extrapulmonary Others	2H ₃ R ₃ Z ₃ E ₃	4H ₃ R ₃
Previously Treated**	Smear-positive relapse Smear-positive failure Smear-positive treatment after default Others ²	2H ₃ R ₃ Z ₃ E ₃ S ₃ / 1H ₃ R ₃ Z ₃ E ₃	5H ₃ R ₃ E ₃

H = Isoniazid, R = Rifampicin, Z = Pyrazinamide, E = Ethambutol, S = Streptomycin

1. The number before the letters refers to the number of months of treatment. The subscript after the letters refers to the number of doses per week.
The dosage strengths are as follows: Isoniazid (H) 600 mg, rifampicin (R) 450 mg, pyrazinamide (Z) 1500 mg, ethambutol (E) 1200 mg, streptomycin (S) 750 mg.
 - Patients who weigh 60 kg or more receive additional rifampicin 150 mg.
 - Patients who are more than 50 years old receive streptomycin 500 mg. Patients who weigh less than 30 kg, receive drugs as per paediatric weight band boxes according to body weight.
1. In rare and exceptional cases, patients who are sputum smear-negative or who have extra-pulmonary disease can have recurrence or non-response. This diagnosis in all such cases should always be made by an MO and should be supported by culture or histological evidence of current, active TB. In these cases, the patient should be typed as 'Others' and given treatment regimen for previously treated
 - * New includes former categories I and III
 - ** Previously treated is former category II.

Table 1.8. RNTCP treatment regimen in children

Category of treatment	Type of patients	TB treatment regimens	
		Intensive phase	Continuation phase
New cases	<ul style="list-style-type: none"> • New smear-positive pulmonary tuberculosis (PTB) • New smear-negative PTB • New extra-pulmonary TB 	2H ₃ R ₃ Z ₃ E ₃ *	4H ₃ R ₃
Previously treated cases	<ul style="list-style-type: none"> • Relapse, failure to respond or treatment after default • Re-treatment • Others 	2S ₃ H ₃ R ₃ Z ₃ E ₃ + 1H ₃ R ₃ Z ₃ E ₃	5H ₃ R ₃ E ₃

H = Isoniazid, R = Rifampicin, Z = Pyrazinamide, E = Ethambutol, S = Streptomycin

* The number before the letters refers to the number of months of treatment. The subscript after the letters refers to the number of doses per week.

Pulmonary TB refers to disease involving lung parenchyma. Extrapulmonary TB refers to disease involving sites other than lung parenchyma. If both pulmonary and extrapulmonary sites are affected, it will be considered as pulmonary for registration purposes. Extrapulmonary TB involving

several sites should be defined by most severe site.

Smear positive: Any sample (sputum, induced sputum, gastric lavage, bronchoalveolar lavage) positive for acid-fast bacilli.

New case: A patient who has had no previous ATT or for less than 4 weeks.

Relapse: Patient declared cured/completed therapy in past and has evidence of recurrence.

Treatment after default: A patient who has taken treatment for at least 4 weeks and comes after interruption of treatment for 2 months and has active disease.

Failure to respond: A case of paediatric TB who fails to have bacteriological conversion to negative status or fails to respond clinically/or deteriorates after 12 weeks of compliant intensive phase shall be deemed to have failed response provided alternative diagnoses/reasons for non-response have been ruled out.

Others: Cases who are smear negative or extra-pulmonary but considered to have relapse, failure to respond or treatment after default or any other case which do not fit the above definitions.

In patients with TB meningitis on Category I treatment, the four drugs used during the intensive phase can either be HRZE or HRZS. The present evidence suggests that ethambutol can be used in children. Children who show poor or no response at 8 weeks of intensive phase may be given benefit of extension of IP for one more month. In patients with TB meningitis, spinal TB, miliary/disseminated TB and osteoarticular TB, the continuation phase shall be extended by 3 months making the total duration of treatment to a total of 9 months. A further extension may be done for 3 more months in continuation phase (making the total duration of treatment to 12 months) on a case to case basis in case of delayed response and as per the discretion of the treating physician.

Steroids should be used initially in hospitalized cases of TBM and TB pericarditis and reduced gradually over 6 to 8 weeks. **In all instances before starting a child on previously treated regimen, patient should be examined by a paediatrician or TB expert, whoever available.** As children can have significant increase in body weight on treatment, the doses may be increased in proportion of increase in body weight (Tables 1.9-1.11).

Table 1.9. Drug dosage charts for the anti-tuberculosis drugs

Drug	Formulations	Daily therapy (mg/kg/day)	Thrice weekly therapy (mg/kg/day)	Route, frequency
INH (H)	Tab. 100, 300 mg Syrup 100 mg/5 ml	10	15 (12-17)	Oral, once a day
Rifampicin (R)	Cap 150, 300, 450, 600 mg Susp. 100 mg/5 ml	10	15 (12-17)	Oral, once a day Empty stomach
Pyrazinamide (Z)	Tab. 500, 750, 1000 mg, Syrup 300 mg/5 ml	25-35	35(30-40)	Oral, once a day
Ethambutol (E)	Tab. 200, 400, 800, 1000 mg	15	30(25-30)	Oral, once a day
Streptomycin (S)	Inj. 500, 750, 1000 mg	15	15	Intramuscular, once a day

Treatment of MDR tuberculosis (To be treated under DOTS Plus of RNTCP)

- Very important to prevent MDR by avoiding monotherapy/poor compliance to treatment.
- Drugs susceptibility testing should be done. If not available, treatment regimen as above.
- Patients with meningitis, bone and joint tuberculosis and miliary TB should receive minimum of 12 months of treatment.

Pregnant women

Avoid Pyrazinamide, Streptomycin is contraindicated. Give Isoniazid (INH), Rifampicin and Ethambutol for 2 months followed by INH and Rifampicin for 7 months. Lactating women can continue to breastfeed.

Women on oral contraceptives

Switch over to alternate methods of contraception.

Patients with renal disease.

- Avoid aminoglycosides.
- Avoid Ethambutol and monitor for side effects.
- Reduce doses of INH and Pyrazinamide in cases of severe renal failure.

Patient with hepatic disease

Avoid INH, Rifampicin and Pyrazinamide.

Patients with HIV/AIDS.

All patients diagnosed as TB cases should be referred to nearest ICTC for HIV testing. ART to be given to all patients with extrapulmonary TB (stage 4) and all those with pulmonary TB (stage 3) with CD4 count <350 cells/ cu mm (for details see section on AIDS in Chapter 7).

Patients with pericardial effusion, severe pleural effusion, meningitis.

Steroid (oral/injectable) to be given along with the antitubercular therapy.

In tubercular meningitis

(see section on tubercular meningitis)

Tubercular pericarditis.

In addition to ATT, Tab. Prednisolone 40-60 mg for 2 weeks with gradual tapering over next 4 weeks.

Pleural effusion.

In addition to ATT, Tab. Prednisolone may be considered, in patients who are toxic or with large effusions.

Chemoprophylaxis

The dose of INH for chemoprophylaxis was recommended to be 10 mg/kg administered daily for 6 months. TB preventive therapy should be provided to:

- All asymptomatic contacts (under 6 years of age) of a smear positive case, after ruling out active disease and irrespective of their BCG or nutritional status.
- All HIV-infected children who either had a known exposure to an infectious TB case or are tuberculin skin test (TST) positive (≥ 5 mm induration) but have no active TB disease.
- All tuberculin skin test (TST) positive children who are receiving immunosuppressive therapy (e.g. children with nephrotic syndrome, acute leukaemia etc).
- A child born to mother who was diagnosed to have TB in pregnancy should receive prophylaxis for 6 months, provided congenital TB has been ruled out.

BCG vaccination can be given at birth even if INH chemoprophylaxis is planned.

Treatment in special situations***Monitoring and evaluation*** (Fig. 1.6)

Paediatric focused monitoring may preferably be an integral part of programme.

Whenever possible, follow-up sputum examination is to be performed with same frequency as in adults.

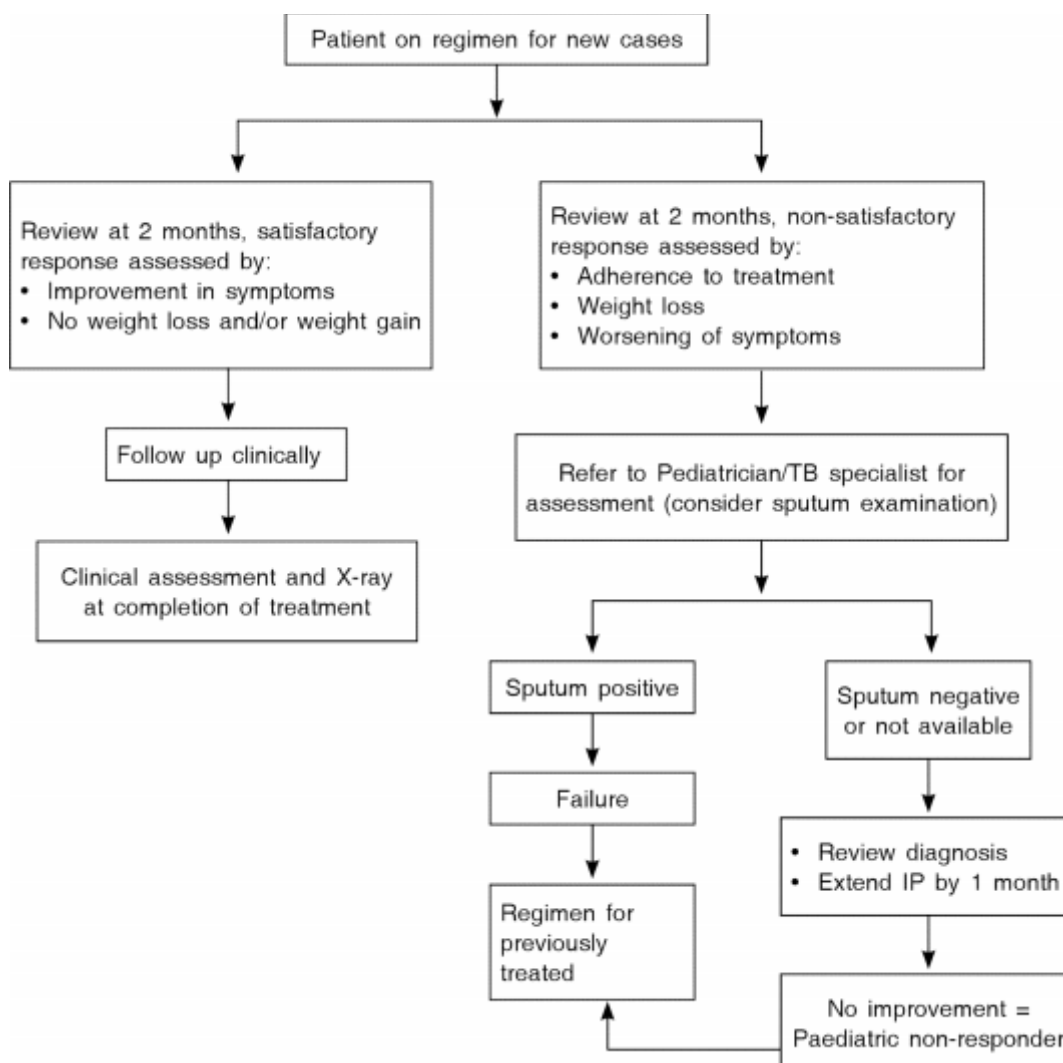


Fig 1.6 Clinical monitoring of case

Clinical symptomatic improvement is to be assessed at the end of intensive phase of treatment and at the end of treatment. Improvement should be judged by

- Absence of fever or cough,
- A decrease in size of lymph node(s) and weight gain/no weight loss.
- Radiological improvement is to be assessed by chest X-ray examination in all smear-negative pulmonary TB cases at end of treatment.

DOTS is the recommended strategy for treatment in adults and children. All paediatric TB patients should be registered under RNTCP. It is important to ensure completion of treatment in every case

put on treatment to prevent emergence of resistance, particularly to Rifampicin. In the rare circumstances where a patient is given daily therapy, observation and completion of therapy remains as important. It is the duty of the prescriber to ensure appropriate and complete treatment in all cases.

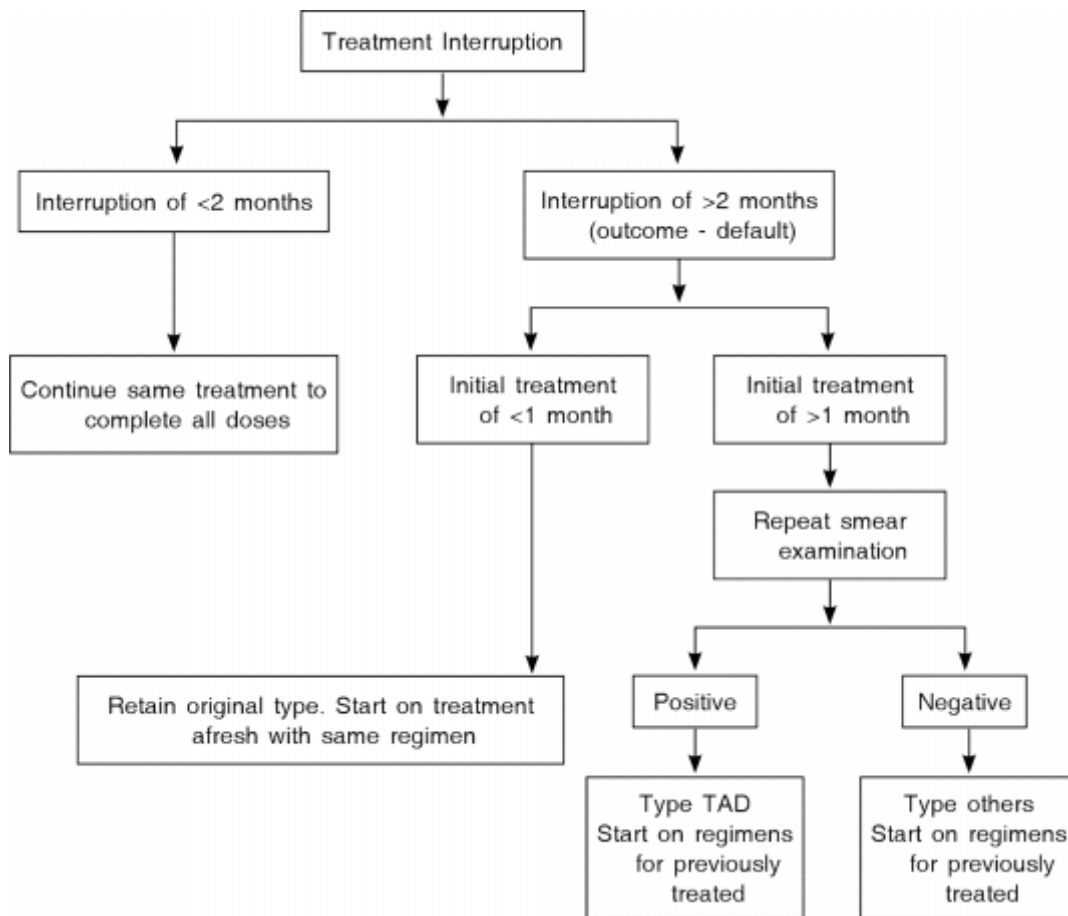


Fig 1.7 Management of patients with treatment interruption

Recording and reporting

In addition to the existing information, especially in relation to paediatric TB patients, the treatment card should include information on:

- Basis for starting treatment along with categorization.
- Documentation of clinical and radiological monitoring as described above. This information could be clubbed with the table for laboratory results in the present treatment card.
- X-rays should be retained until treatment completion, and a drawing of the X-ray picture with comments, entered in the remarks column.
- Provision to check correct categorization and drug dosages. A dosage table based on patient's weight could be printed on the card to ensure correct dosage for the child.

Assessment of response to therapy

1. The short course chemotherapy as enlisted above leads to a rapid clinical response in most patients

- in 2-4 weeks. Inadequate combination or dosage of this can lead to emergence of resistance and should be avoided at all cost.
2. The response to therapy should be monitored by bacteriological conversion in positive cases and by other markers like clinical and/or radiological improvement in AFB negative cases at the end of 2 months of intensive phase. A bacteriological conversion in over 80% of cases after 2 months of therapy is expected. If the patient continues to excrete bacteria after 2 months, the intensive phase needs to be extended by a month, and also ensure patient compliance, as non-adherence is the most common cause for non-response. If a patient continues to be symptomatic or bacteriologically positive after an extended phase of IP, then the patient should be extensively re-evaluated and treatment failure/drug resistance should be suspected. The patient should be referred to a higher centre for further management. Remember persistence or recurrence of symptoms or radiological shadow could be due to secondary or coinfection with other organisms or due to a non-tuberculous lesion. Radiological response may lag behind bacteriologic cure and hence should not be the deciding factor for stopping of treatment. In patients with extrapulmonary tuberculosis, the response to treatment is assessed clinically.
 3. All patients should have baseline LFTs; should be monitored regularly in patients at high risk of hepatitis, e.g. old patients, alcoholics, diabetics and malnourished.
 4. Monitoring and management of side effects: The suggested therapy is usually well tolerated. However, some patients can develop GI intolerance, vomiting, etc. for which only symptomatic therapy is required. Commonest major side effect with suggested regime is drug-induced hepatitis. The easily recognizable symptom of high-coloured urine in jaundiced patient is masked due to discolouration of urine because of rifampicin. Suspect hepatitis, if vomiting is persistent and associated with anorexia. ***Clinically, icterus may be evident. In all cases of jaundice, stop treatment and refer to a higher centre for evaluation.*** In most patients, the drugs can be reintroduced after the hepatitis has resolved. Pyrazinamide-induced arthralgia or arthritis usually responds suitably to analgesic therapy. Drug rash and hypersensitivity is a major side effect where patient needs to be referred to a higher centre. Peripheral neuropathy due to INH is treated with oral vitamin B₆. Ethambutol can cause optic neuritis particularly when used in high doses and requires omission of the drug once this side effect occurs.
 5. In case of hypersensitivity reaction, discontinue all drugs, re-challenge with individual drug to determine the likely offending drug. Do not reintroduce rifampicin in patients who develop thrombocytopenia. Hyperuricaemia can occur due to pyrazinamide. Needs to be discontinued only in case of secondary gout.

References

1. Tuberculosis. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp 1340-1359.
2. RNTCP: TB in Children. Consensus Guidelines of Paediatricians, TB experts and TB Control Programme Managers, Central TB Divisions. Directorate of Health and Family Welfare, Nirman Bhavan, New Delhi, 2012.
3. Technical Guidelines for Tuberculosis Control. Central TB Division. Directorate General of Health Services, Ministry of Health and Family Welfare, Nirman Bhawan, New Delhi, 2009.
4. Indian J Med Res 120 October 2004 pp 316-353.

MALARIA

Parasitic infection due to four plasmodia species: *P. falciparum*, *P. vivax*, *P. malariae*, and *P. ovale* transmitted by the female Anopheles mosquito.

Clinical Features -

- Malaria - paroxysms of fever, chills, sweats, fatigue, anaemia and splenomegaly.
- Falciparum malaria (severe and complicated malaria) - Mental clouding, coma, convulsions, delirium and occasionally localizing signs. Hyperpyrexia ($>40.5^{\circ}\text{C}$), haemolysis, haematocrit $<15\%$ or Hb <5 g/dl, hypoglycaemia, oliguria, anuria, pulmonary oedema, macroscopic haemoglobinuria and jaundice.

Diagnosis

- Thick and thin blood smear showing presence of protozoa
(Note that blood films may be negative even in a severe attack because of sequestration of parasites in the deep capillaries.)
- Rapid diagnostic kits (RDK) can be used for detection of *P. falciparum* where microscopy results are not obtainable within 24 hours of sample collection

Treatment of malaria

1. All fever cases suspected to be malaria should be investigated by microscopy or RDT.
2. Patients of uncomplicated malaria can be managed at primary level but patients with severe malaria with complications should be admitted and managed in a hospital where facilities for detailed investigations and blood transfusion exist.
3. *P. vivax* cases should be treated with chloroquine for three days and Primaquine for 14 days. Primaquine is used to prevent relapse but is contraindicated in pregnant women, infants and individuals with G6PD deficiency. Note: Patients should be instructed to report back in case of haematuria or high-coloured urine/cyanosis or blue coloration of lips and Primaquine should be stopped in such cases. Care should be taken in patients with anaemia.
4. *P. falciparum* cases should be treated with ACT (Artesunate 3 days + Sulphadoxine-Pyrimethamine 1 day). This is to be accompanied by single dose primaquine on day 2.
5. Pregnant women with uncomplicated *P. falciparum* should be treated as follows:
1st trimester: Quinine
2nd & 3rd trimester: ACT

Note: Primaquine is contraindicated in pregnant woman.

6. In cases where parasitological diagnosis is not possible due to non-availability of either timely microscopy or RDT, suspected malaria cases should be treated with full course of chloroquine, till the results of microscopy are received. Once the parasitological diagnosis is available, appropriate treatment as per the species, is to be administered.
7. Presumptive treatment with chloroquine is no more recommended.
8. Resistance should be suspected, if despite full treatment (with no history of vomiting, diarrhoea,) patient does not respond within 72 hours, clinically and parasitologically. Such cases not responding to ACT, should be treated with oral Quinine with Tetracycline/Doxycycline. These instances should be reported to concerned District Malaria/State Malaria Officer/ROHFW for initiation of therapeutic efficacy studies.

Treatment of *P. vivax* cases (Table 1.12)

1. **Chloroquine:** 25 mg/kg body weight divided over three days, i.e. 10 mg/kg on day 1, 10 mg/kg on day 2 and 5 mg/kg on day 3.
2. **Primaquine:** 0.25 mg/kg body weight daily for 14 days.

Table 1.12. Age-wise dosage schedule for treatment of *P. vivax* cases

Age (in years)	Tab Chloroquine (150 mg base)			Tab Primaquine (2.5 mg base)
	Day-1	Day-2	Day-3	Day-1 to Day-14
<1	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{4}$	0
1-4	1	1	$\frac{1}{2}$	1
5-8	2	2	1	2
9-14	3	3	$\frac{1}{2}$	4
15 & above	4	4	2	6

* Primaquine is contraindicated in infants, pregnant women and individuals with G6PD deficiency. 14 days regimen of Primaquine should be given under supervision

Treatment of uncomplicated *P. falciparum* cases (Table 1.13)

1. **Artemisinin based combination therapy (ACT):** Artesunate 4 mg/kg body weight daily for 3 days plus Sulfadoxine (25 mg/kg body weight) -Pyrimethamine (1.25 mg/kg body weight) on first day.
(**Caution:** ACT is not to be given in 1st trimester of pregnancy).
2. **Primaquine:** 0.75 mg/kg body weight on day 2: 0.75 mg/kg body weight on day

Table 1.13. Age-wise dosage schedule for treatment of *P. falciparum* cases

Age (in years)	1st day		2nd day		3rd day
	Artesunate (50 mg)	SP*	Artesunate (50 mg)	Primaquine (7.5 mg Base)	Artesunate (50 mg)
<1	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{2}$	0	$\frac{1}{2}$
1-4	1	1	1	1	1
5-8	2	$\frac{1}{2}$	2	2	2
9-14	3	2	3	4	3
15 & above	4	3	4	6	4

Treatment of uncomplicated *P. falciparum* cases in pregnancy

1st trimester: Quinine salt 10 mg/kg 3 times daily for 7 days (**Caution:** Quinine may induce hypoglycaemia; pregnant women should not start taking quinine on an empty stomach and should eat regularly, while on quinine treatment).

2nd and 3rd trimesters: ACT as per dosage given above.

Treatment of mixed infections (*P. vivax* + *P. falciparum*) case

All mixed infections should be treated with full course of ACT and Primaquine 0.25 mg per kg daily for 14 days.

Treatment of severe malaria cases

Inj. Artesunate 2.4 mg/kg IV or IM given on admission (time = 0h); then at 12 h and 24 h and then once a day.

(**Caution:** Care should be taken to dilute artesunate powder in 5% sodium bicarbonate provided in the pack only)

Or

Inj. Artemether 3.2 mg/kg IM given on admission and then 1.6 mg/kg per day. **Or**

Inj. Arteether 150 mg IM daily for 3 days in adults only (not recommended for children).

Or

Inj. Quinine: 20 mg/kg on admission (IV infusion or divided IM injection) followed by maintenance dose of 10 mg/kg 8 hourly. The infusion rate should not exceed 5 mg salt/kg per hour. Loading dose of Quinine, i.e. 20 mg/kg on admission may not be given, if the patient has already received quinine or if the clinician feels inappropriate). **NEVER GIVE BOLUS INJECTION OF QUININE.** If parenteral quinine therapy needs to be continued beyond 48 hours, reduce dose to 7 mg/kg 8 hourly.

Note: The parenteral treatment in severe malaria cases should be given for minimum of 24 hours once started (irrespective of the patient's ability to tolerate oral medication earlier than 24 hours) followed by a full course of ACT for 3 days.

Those patients who received parenteral Quinine therapy and can take orally should receive: Oral Quinine 10 mg/kg three times a day for 7 days (including the days, when parenteral Quinine was administered) plus Doxycycline 3 mg/kg once a day or Clindamycin 10 mg/kg 12-hourly for 7 days (Doxycycline is contraindicated in pregnant women and children under 8 years of age; instead, give clindamycin 10 mg/kg 12 hourly for 7 days).

Monitoring

Monitor core temperature (preferably rectal), respiratory rate and depth, pulse, blood pressure and level of consciousness every 4 hours; Record urine output, and look for the appearance of brown or black urine (haemoglobinuria) or oliguria; Monitor therapeutic response, both clinical and parasitological, by regular observation and blood films; Carry out regular laboratory evaluation of haematocrit or haemoglobin, glucose, urea or creatinine and electrolytes; Avoid drugs that increase the risk for gastrointestinal bleeding (aspirin, corticosteroids).

Supportive treatment

Treat fever, hypoglycaemia, electrolyte imbalance, hypotension, renal failure, anaemia, convulsions appropriately (for details see respective sections).

Chemoprophylaxis

Chemoprophylaxis should be administered only in selective groups in high *P.falciparum* endemic areas.

Short-term chemoprophylaxis (up to 6 weeks)

Tab. Doxycycline 100 mg once daily for adults and 1.5 mg/kg once daily for children (contraindicated in children below 8 years). The drug should be started 2 days before travel and continued for 4 weeks after leaving the malaria endemic area. **Note:** It is not recommended for pregnant women and children less than 8 years.

Chemoprophylaxis for longer stay (more than 6 weeks)

Tab. Mefloquine 250 mg weekly for adults and should be administered two weeks before, during and four weeks after exposure.

Note: Mefloquine is contraindicated in individuals with history of convulsions, neuropsychiatric problems and cardiac conditions. Therefore, necessary precautions should be taken and all should

undergo screening before prescription of the drug.

References

1. National Antimalaria Programme (NAMP) Drug Policy, Government of India, Ministry of Health and Family Welfare, Directorate General of Health Services. Directorate of National Anti Malaria Programme. Delhi, 2010.
2. Malaria (Plasmodium). In: Nelson's Textbook of Paediatrics. Behrman RE, Kliegman RM, Jenson HB (eds), 19th Edition, Harcourt Publishers International Company, 2011; pp 1198-1207.
3. Facility Based IMNCI (F-IMNCI) Participants manual. WHO, unicef, and Ministry of Health & Family Welfare, Government of India, 2009.
4. NIMR-TRS-01/June2011.

DENGUE

Dengue is tropical viral disease transmitted by *Aedes aegypti* mosquito

Clinical Features

- **Dengue fever**-fever of 2-7 days duration with two or more of the following manifestations: Headache, retro-orbital pain, myalgia/arthralgia, rash, haemorrhagic manifestation (petechiae and positive tourniquet test) and leucopenia.
- **Dengue haemorrhagic fever (DHF)**, if one or more of the following are present: Positive tourniquet test, petechiae, ecchymosis or purpura, bleeding from mucosa, injection or other sites, haematemesis or melaena, thrombocytopenia (platelets $100,000/\text{mm}^3$ or less) and evidence of plasma leakage.
- **Dengue shock syndrome (DSS)**. All the above criteria of DHF plus signs of circulatory failure.

Diagnosis

- Demonstration of IgM antibody specific for dengue virus.
- CBP - Total leucocytes count is either normal or decreased. Platelet count is less than normal.
- Tourniquet test - 10 or more petechiae per 2.5 cm^2 (In DHF more definite result i.e. >20 petechiae). The test may be negative or mildly positive during the phase of profound shock.

Treatment

DHF is classified into four grades of severity, where grades III and IV are considered to be DSS.

Grade I : Fever accompanied by non-specific constitutional symptoms; the only haemorrhagic manifestation is a positive tourniquet test and/or easy bruising.

Grade II : Spontaneous bleeding in addition to the manifestations of grade I patients, usually in the form of skin or other haemorrhages.

Grade III : Circulatory failure manifested by a rapid, weak pulse and narrowing of pulse pressure or hypotension, with the presence of cold, clammy skin and restlessness.

Grade IV : Profound shock with undetectable blood pressure or pulse.

DF and DHF during febrile phase

Instruct to report immediately if patient develops any of the following danger signals: Severe abdominal pain, passage of black stools, bleeding into the skin or from the nose or gums, sweating and cold skin.

Nonpharmacological

Bed rest and plenty of oral fluids or ORS. Use of cold/tepid sponging to keep temperature below 38.5°C.

Pharmacological

1. Tab. Paracetamol 500 mg 6 hourly (not more than 4 times in 24 hours).

(Caution: No role of antibiotics, steroids; do not give aspirin or ibuprofen as these medicines may aggravate bleeding).

2. ORS in patients with dehydration.

Follow-up daily until temperature is normal. Check haematocrit daily where possible. Check for signs of severe illness.

Indications for hospitalization

Tachycardia, increased capillary refill time (>2 seconds), cool, mottled or pale skin, diminished peripheral pulses, changes in mental status, oliguria, sudden rise in haematocrit or continuously elevated haematocrit despite administration of fluids, narrowing of pulse pressure (<20 mm Hg), hypotension (a late finding representing uncorrected shock).

Fluid management – cases without shock (pulse pressure >20 mm Hg) (Fig. 1.8)

DHF grade III (with circulatory failure) and grade IV (profound shock with undetectable blood pressure and pulse).

Immediately admit the patient to a hospital where trained personnel can manage shock and where blood transfusion facilities are available (Fig. 1.9). Refer patients with refractory shock and with major bleeding to specialized care unit.

References

1. Guidelines for Clinical management of Dengue fever, Dengue Haemorrhagic Fever, Dengue Shock Syndrome. National Vector Borne Disease Control Programme (NVBDCP), Government of India, 2008.
2. Facility Based IMNCI (F-IMNCI) Participants manual. WHO, UNICEF, and Ministry of Health & Family Welfare, Government of India, 2009.
3. National guidelines for clinical management of dengue fever Govt of India 2014.

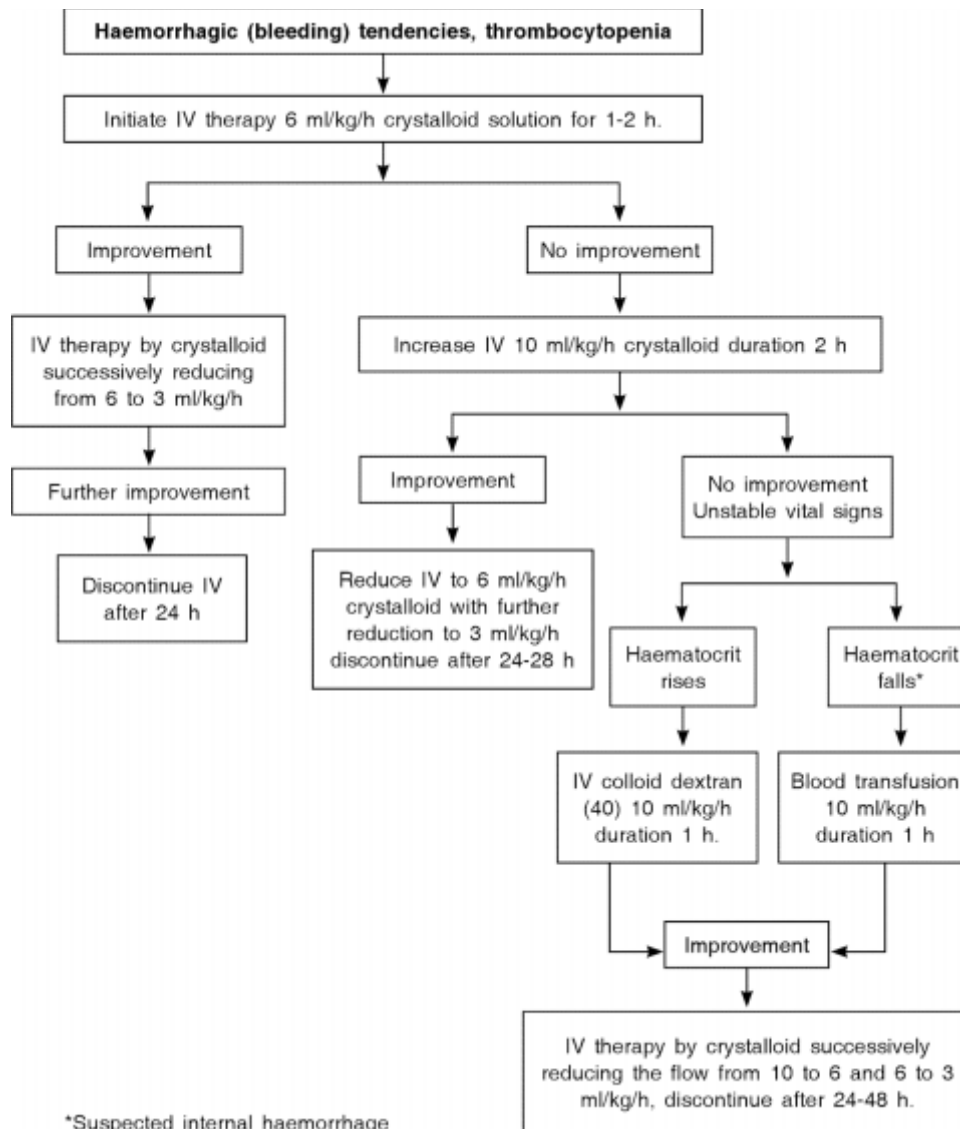


Fig. 1.8. Volume replacement flowchart for patients with DHF Grades I & II.

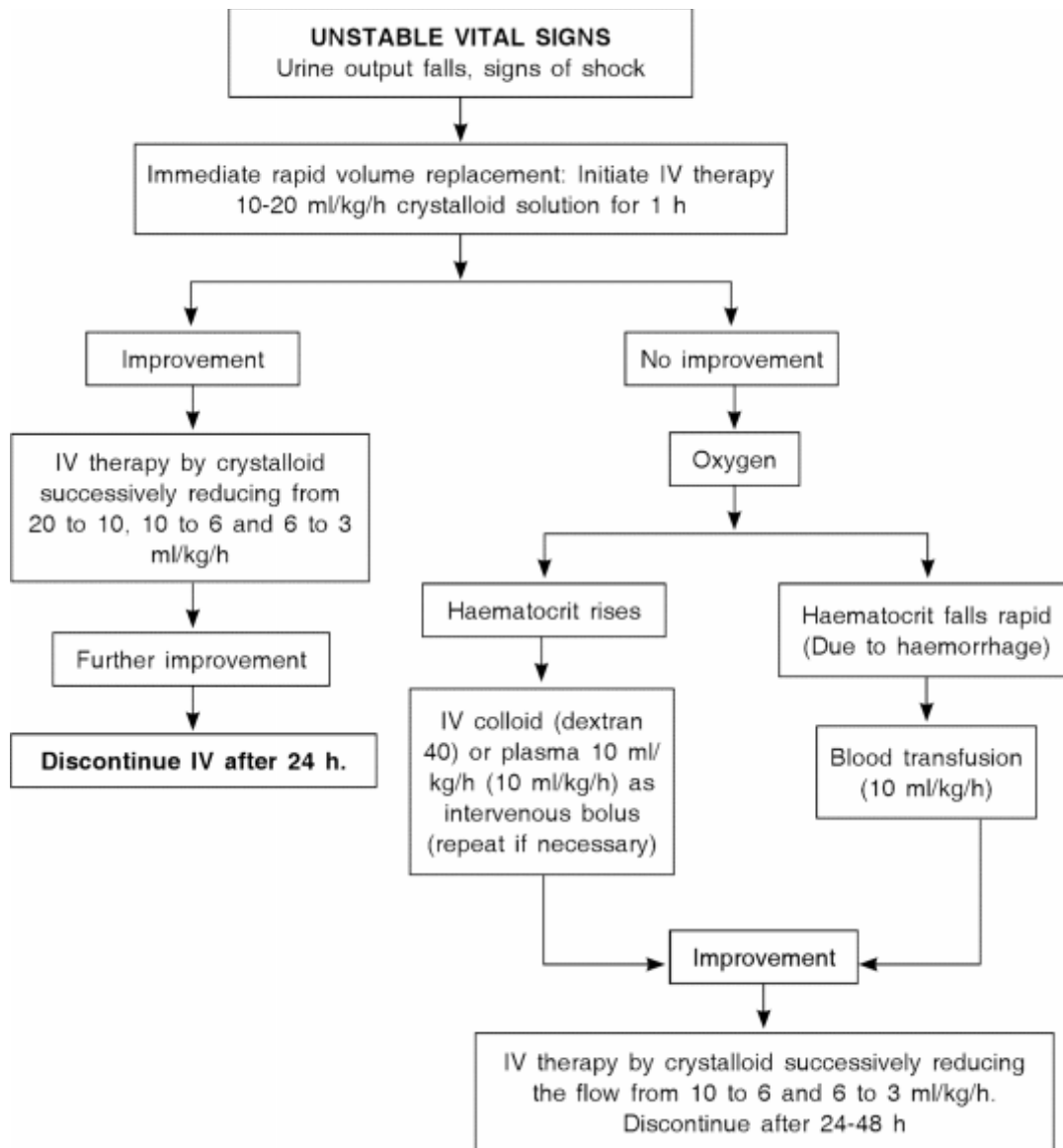


Fig. 1.9. Volume replacement flowchart for patients with DHF Grades III & IV.

CHIKUNGUNYA

Chikungunya is caused by an arbovirus and transmitted by *Aedes aegypti* mosquito.

Clinical Features

- Sudden onset of flu-like symptoms - fever, chills, headache, nausea, vomiting, severe joint pain (arthralgia) and rash.
- Rash with defervescence around day 2 or day 3 of the disease, most intense on trunk and limbs and may desquamate.
- Migratory polyarthritis usually affects the small joints.
- Joints of the extremities swollen and painful to touch.
- Meningoencephalitis(rare) seen in newborn.
- Residual arthritis, with morning stiffness, swelling and pain on movement may persist after recovery.

Treatment

Treatment is mainly supportive as there is no specific treatment and is same as for dengue (For details see section on Dengue).

References

1. Guidelines for Clinical management of Dengue fever/Dengue Haemorrhagic Fever, Dengue Shock Syndrome. National Vector Borne Disease Control Programme (NVBDCP), Government of India, 2008.
2. Facility Based IMNCI (F-IMNCI) Participants manual. WHO, unicef, and Ministry of Health & Family Welfare, Government of India, 2009

TYPHOID OR ENTERIC FEVER

It is caused by *Salmonella typhi* and *paratyphi*.

Clinical Features -

- Patient looks sick and toxic with a coated tongue.
- Fever - gradual, continuous (temperature up to 40°C) with constitutional symptoms like malaise, anorexia, lethargy, headache,
- Constipation or diarrhoea (pea-soup stool)
- Abdominal pain and tenderness with hepatomegaly, splenomegaly.
- Change in mentation.
- In infants - acute febrile illness with shock and hypothermia.
- On examination - relative bradycardia and mild soft splenomegaly.

Diagnosis

- Complete blood counts - Leucopenia or pancytopenia in 10-25% cases.
- Widal test - rising titers of 'O' antibodies .Level of 1 in 160 dilution or more is taken as positive test. Widal test may be negative in cases with fever of less than 5-7 days duration.
- Isolation of organism in blood, bone-marrow, urine or stool.
- Blood culture and sensitivity testing/ IGM.

Treatment

Nonpharmacological

Adequate nutrition and hydration should be maintained .

In-patient treatment is recommended, if -

- Patient not accepting orally with inadequate urine output.
- Patient has altered sensorium/drowsiness.
- High pyrexia particularly in the second week of illness when the risk of complications increases or if the complications have already ensued.

Pharmacological

Management of fever (see section on fever).

(Antipyretics can cause precipitous fall in temperature and even shock, in enteric fever. Hydrotherapy is preferred for fever management in such patients.

Specific therapy.

A. In Adults

Uncomplicated enteric fever

Tab. Ciprofloxacin 10 mg/kg in 2 divided doses, up to a maximum of 750 mg twice a day for 10-14 days (for 1 week after the fever subsides). Oral drug should be taken about an hour after meals and not on empty stomach.

Or

Tab. Ofloxacin 200-400 mg daily for 5-7days.

Or

Cap. Azithromycin 10-20 mg/kg (max 500 to 1000 mg/day) once daily for 7 days.

In Severe enteric fever (hospitalized patients)

Inj. Ceftriaxone 50-60 mg/kg per day IV or IM in 2 divided doses or as a single dose for 7-10 days (preferred in pregnant women patients, children or patients resistant to quinolones).

Or

Tab. Cefixime 200-400 mg daily as single dose or 2 divided doses for 14 days.

Or

Inj. Ciprofloxacin 200 mg IV twice a day

If there is no response after 5 days, alternative diagnosis should be considered.

B. In Children

- The usual duration of antibiotic treatment is 10-14 days or at least 7 days after the patient has become afebrile. Intravenous therapy is used during acute phase among the admitted patients. Less sick patients can be treated with oral drugs on an outpatient basis.

Treatment in Uncomplicated Enteric Fever

Susceptibility	First line drugs			Second line drugs		
	Antibiotic	Daily Dose (mg/kg)	Days	Antibiotic	Daily Dose (mg/kg)	Days
Fully sensitive	3 rd generation Cephalosporin e.g. Cefixime	15-20	14	Chloramphenicol	50-75	14-21
				Amoxicillin	75-100	14
				TMP-SMX	8 TMP	14
					40 SMX	
Multidrug Resistant	3rd generation Cephalosporin e.g. Cefixime	15-20	14	Azithromycin	10-20	14

Treatment of Severe Enteric Fever in children

Susceptibility	First line drugs			Second line drugs		
	Antibiotic	Daily Dose (mg/kg)	Days	Antibiotic	Daily Dose (mg/kg)	Days
Fully sensitive	Ceftriaxone or Cefotaxime	50-75	14	Chloramphenicol	100	14-21
				Ampicillin	100	14
				TMP-SMX	8 TMP	14
					40 SMX	
Multidrug Resistant	Ceftriaxone or Cefotaxime	50-75	14	Aztreonam	50-100	14

Report to the physician immediately if abdominal symptoms worsen or occurrence of bleeding per rectum or alteration in sensorium and shock (severe typhoid with high risk of fatality).

Severe typhoid with shock or patients with enteric encephalopathy should be hospitalized and treated as above plus Inj. Dexamethasone 3 mg/kg IV first dose followed by 1 mg/kg IV every 6 hourly for 8 doses.

Chronic carrier state

Tab. Ciprofloxacin 750 mg twice a day for 28 days or Cap. Amoxicillin 100 mg/ kg/d with probenecid acid 30 mg/kg/day or Tab. Cotrimoxazole 10 mg/kg/d of TMP for 4-6 weeks.

Indications for inpatient treatment

- Myocarditis
- Shock
- Perforation peritonitis

In case the patient worsens or fails to show any response to therapy in 4-7 days or so, as discussed above, then a change of antibiotics is suggested, preferably on the basis of the culture sensitivity report, where available.

References

1. Salmonellosis. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp 1274-1281.

2. IAP Task Force report: Management of Enteric Fever in Children. Indian Paediatrics 2006; 884-887.
3. Salmonella. In: Nelson's Textbook of Paediatrics. Behrman RE, Kliegman RM, Jenson HB (eds), 19th Edition, Harcourt Publishers International Company, 2011; pp 948-961.
4. API Recommendations for management of typhoid fever Japi.org Vol63 Nov 2015.

RHEUMATIC FEVER AND RHEUMATIC HEART DISEASE

Rheumatic fever is self-limiting multi-system inflammatory disease that occurs as a delayed sequelae (2-6 weeks) to group A beta haemolytic streptococcal pharyngitis. Chronic and progressive damage to heart valves lead to rheumatic heart disease (RHD).

Clinical Features

Revised Jone's criteria

A. For all patient populations with evidence of preceding GAS infection	
Initial ARF	2 Major or 1 major plus 2 minor manifestations
Recurrent ARF	2 Major or 1 major and 2 minor or 3 minor
B. Major criteria	
Low-risk populations*	Moderate- and high-risk populations
Carditis† • Clinical and/or subclinical	Carditis • Clinical and/or subclinical
Arthritis • Polyarthritis only	Arthritis • Monoarthritis or polyarthritis • Polyarthralgia‡
Chorea	Chorea
Erythema marginatum	Erythema marginatum
Subcutaneous nodules	Subcutaneous nodules
C. Minor criteria	
Low-risk populations*	Moderate- and high-risk populations
Polyarthralgia	Monoarthralgia
Fever ($\geq 38.5^{\circ}\text{C}$)	Fever ($\geq 38^{\circ}\text{C}$)
ESR ≥ 60 mm in the first hour and/or CRP ≥ 3.0 mg/dL§	ESR ≥ 30 mm/h and/or CRP ≥ 3.0 mg/dL§
Prolonged PR interval, after accounting for age variability (unless carditis is a major criterion)	Prolonged PR interval, after accounting for age variability (unless carditis is a major criterion)

ARF - acute rheumatic fever; CRP, C-reactive protein; ESR, erythrocyte sedimentation rate; and GAS, group A streptococcal infection.

* Low-risk populations are those with ARF incidence ≤ 2 per 100 000 school-aged children or all-age rheumatic heart disease prevalence of ≤ 1 per 1000 population per year.

† Subclinical carditis indicates echocardiographic valvulitis as defined in Table 3.

‡ Polyarthralgia should only be considered as a major manifestation in moderate- to high-risk populations after exclusion of other causes. As in past versions of the criteria, erythema marginatum

and subcutaneous nodules are rarely “stand-alone” major criteria. Additionally, joint manifestations can only be considered in either the major or minor categories but not both in the same patient.

- § CRP value must be greater than upper limit of normal for laboratory. Also, because ESR may evolve during the course of ARF, peak ESR values should be used.

Diagnosis

- Raised ASO titer (>333 units for children and >250 units for adults)
- Positive throat swab

Treatment (acute rheumatic fever)

Hospitalization is needed for moderate to severe carditis, severe arthritis or chorea.

Nonpharmacological

- Rest is individualized according to symptoms.
- Appropriate diet is a must for a growing child with cardiac involvement.
- In severe CHF, salt restriction, fluid restriction, upright posture.
- Protect patient from getting injured in chorea.

Pharmacological

In arthritis and mild carditis without CHF.

Tab. Aspirin 6-8 mg/kg/d in 4 divided doses for 2-3 weeks, taper doses once symptoms resolve.

In children: 100 mg/kg/day for 3-5 days followed by 60-70 mg/kg/day and for older children 50 mg/kg/day for 4 weeks to be given after meals.

If no response in 4 days, rule out other conditions like chronic inflammatory, myeloproliferative disorders before switching over to steroids.

In carditis with CHF.

Prednisolone: 2 mg/kg/d, maximum 80 mg/day till ESR normalizes—usually 2 weeks and taper over 2-4 weeks, reduce dose by 2.5-5 mg every 3rd day. Start aspirin 50-75 mg/kg/d simultaneously, to complete total 12 weeks.

(**Caution:** Monitor blood pressure and blood sugar).

Duration of treatment for arthritis is 4-6 weeks and for carditis is 3-6 months.

If no response to oral steroid therapy

Start **Inj. Methyl Prednisolone** 30 mg/kg/day for 3 days.

For treatment of CHF (see section on cardiac failure).

In chorea- Mild chorea is treated with quiet environment, and sedatives like oral phenobarbitone or diazepam.

If there is no response, Tab. Haloperidol 0.25-0.5 mg/kg/d in 2-3 divided doses for 2-4 weeks after clinical improvement

Or

Tab. Sodium valproate 15 mg/kg/day for 2-4 weeks after clinical improvement

Or

Tab. Carbamazepine 7-20 mg/kg/day for 2-4 weeks after clinical improvement Resistant cases can be treated with plasmapheresis or pimozide.

If there are laboratory features of rheumatic activity (ESR, CRP, ASO), anti-inflammatory drugs must

also be given.

Treatment for group A streptococci infection-All patients with acute rheumatic fever should be treated

Inj. Benzathine penicillin 1.2 MU single IM after test dose

(In children: 1.2 MU (>27 kg), 0.6 MU (<27 kg) IM single injection.)

Or

Oral penicillin V 500 mg twice daily for 10 days.

(In children: 125-250 mg twice daily for 10 days.)

Or

Tab Azithromycin 12.5 mg/kg/day once daily for 5 days

Or

Cap Cephalexin 15-20 mg/kg/dose twice a day for 10 days.

For secondary prevention (for prevention of recurrences)

Inj. Benzathine penicillin 1.2 MU (if weight >37 kg) or 0.6MU (if weight <37 kg) IM every 3 weeks

Or

Tab penicillin V 500 mg twice a day; in children 250 mg twice a day **Or**

If patient is allergic to penicillin, Tab. Erythromycin 20 mg/kg/dose (max 500 mg) 2 times a day

(**Caution:** Contraindicated in liver disease).

Duration of prophylaxis

Duration of secondary prevention is individualized.

- Rheumatic fever with carditis and residual valvular involvement at least until 40 years or lifelong.
- Rheumatic fever with carditis and no residual valvular involvement, for 10 years or up to 25 years or whichever is later.
- Rheumatic fever without carditis, for 5 years or until 18 years whichever is later.

References

1. Rheumatic Fever. In: Nelson's Textbook of Paediatrics. Behrman RE, Kliegman RM, Jenson HB (eds), 19th Edition, Harcourt Publishers International Company, 2011; pp 921-925.
2. Consensus guidelines on pediatric acute rheumatic fever and rheumatic heart disease. Working Group on Pediatric Acute Rheumatic Fever and Cardiology Chapter of Indian Academy of Pediatrics. Indian Pediatrics 2008; 45: 565-573.

EPILEPSY

Epilepsy is characterized by chronic, recurrent, unprovoked, paroxysmal changes in neurological function caused by abnormalities in the electrical activity of the brain.

Clinical features

- Seizure (convulsion) with impairment or loss of consciousness

- Abnormal motor activity, tongue biting and incontinence
- Behavioural abnormalities
- Sensory disturbances
- Autonomic dysfunction.

Investigations

- Complete blood count
- Liver enzymes and renal functions before starting AED
- Serum calcium, alkaline phosphatase and other tests of bone metabolism every year for adults taking enzyme-inducing drug.
- EEG for evidence of generalized or focal abnormality.
- CT/MRI for evidence of structural lesion.

Treatment

Pharmacological

Generalised tonic clonic seizures

Tab. Valproic acid 15-40 mg/kg/day in 2 divided doses increased by 200 mg at 3 days interval.

Or

Tab. Phenytoin 3-8 mg/kg/day in 2-3 divided doses or single night dose.

Or

Tab. Carbamazepine 10-35 mg/kg/day (600-1800 mg 3 times a day).

Or

Tab. Phenobarbitone 60-180 mg/day at night.

(In children: 5-8 mg/kg/day)

Partial seizures (simple and complex partial seizures)

Tab. Carbamazepine 10-35 mg/kg/day (600-1800 mg 3 times a day). **Or**

Tab. Valproic acid 15-40 mg/kg/day in 2 divided doses increased by 200 mg at 3 days interval.

Or

Tab. Phenobarbitone 60-180 mg/day at night.

(In children: 5-8 mg/kg/day)

(For febrile seizures see Chapter 19)

If seizures are not controlled with addition of second drug, the patient should be referred to a higher centre for further evaluation and second line drugs such as Lamotrigine, Topiramate, Tiagabine and Gabapentin.

(For seizures due to granuloma see section on Neurocysticercosis)

Generalized absence, myoclonic and akinetic seizures

Sodium valproate is the drug of first choice. In patients who do not achieve adequate seizure control on sodium valproate or do not tolerate, refer to a neurologist. The second choice depends on the seizure type and epilepsy syndrome.

Considering stopping of Antiepileptic drug

Withdrawal in most cases is done after a seizure-free period of 2-3 years. Antiepileptic drugs are usually withdrawn gradually over several months. There is possibility of seizure recurrence during and after withdrawal.

References

1. Seizures and Epilepsy. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp 3251-3270.
2. Seizures in Childhood. In: Nelson's Textbook of Paediatrics. Behrman RE, Kliegman RM, Jenson HB (eds), 19th Edition, Harcourt Publishers International Company, 2011; pp 2013-2039. .
3. Expert Committee on Pediatric Epilepsy, Indian Academy of Pediatrics. Guidelines for diagnosis and management of childhood epilepsy. Indian Pediatr. 2009;46:681-698.
4. Guidelines for management of Status Epilepticus in India. Indian Epilepsy Association 2008.
5. Indian Guideline on Epilepsy Chapter 116. API 2013.

STATUS EPILEPTICUS (SE)

Status epilepticus (SE) is an emergency condition in patients with pre-existing epilepsy. SE can occur due to underlying metabolic disturbances, central nervous system (CNS) infections, head trauma and hypoxia.

Clinical features

- Continuous seizures lasting for at least 30 minutes or two or more discrete seizures between which there is incomplete recovery of consciousness.
- Transient or early (0-30 minutes) - hypertension, increased cerebral blood flow, hyperglycaemia, hyperkalaemia and lactic acidosis.
- After 30 minutes - hypotension, decreased cerebral blood flow, normo- or hypoglycaemia, hypoxia and hyperpyrexia.

Treatment

Out-of-hospital setting

Children and young adults: Rectal diazepam 0.5 mg/kg or buccal midazolam 0.2-0.3 mg/kg.

Adults : Rectal diazepam 10 mg or buccal midazolam 10 mg

IV administration by local doctor or nurse (on doctor's advice) Inj. Lorazepam 2 mg IV or Inj. Diazepam 5-10 mg IV.

General measures: Secure airway, breathing and circulation, safety and check random sugar.

Nonpharmacological

- Adequate oxygenation by nasal cannula or mask,
- Position patient's head for optimal airway patency; patient should be transported in lateral position and clear the mouth of secretions/frothing.
- Rule out the treatable metabolic causes which can precipitate epilepsy.
- Establish IV access, draw venous blood samples for glucose level, serum chemistries, haematological studies, toxicology screens and determination of antiepileptic drug levels and EEG monitoring (if available).
- Assess oxygenation with pulse oximetry or periodic arterial blood gas determinations.
- If hypoglycaemia is established or if blood glucose determination is not available,

administer glucose, in adults, 25% Dextrose IV 50-100 ml immediately (to be preceded by 50 mg IM Thiamine, if patient is a known alcoholic). In children, the dose of glucose is 2 ml/kg of 25% glucose.

Pharmacological (adults)

Inj. Lorazepam 0.1 mg/kg (max 4 mg) at the rate of 2 mg/min IV over one minute (can be repeated after 10-20 min). **Or**

Inj. Diazepam 0.2 mg/kg (max 10 mg) at 5 mg/min IV over one minute (can be repeated, if seizures do not stop after 5 minutes).

Second stage established GCSE (20-60 minutes)

1. **Inj. Phenytoin** 15-20 mg/kg slow infusion in saline (not more than 50 mg/min).

(**Caution:** Phenytoin is incompatible with glucose containing solutions; purge IV line with normal saline before administering phenytoin infusion; IM not recommended as absorption is erratic).

If seizures are not controlled after 10 minutes after a loading dose of phenytoin, give additional dose of Phenytoin 5-10 mg/kg IV at the rate of 50 mg/min. **Or**

Inj. Fosphenytoin 15-18 mg/kg phenytoin equivalent (PE) at 150 mg PE/min

(**Caution:** Cardiac monitoring and check BP as it can produce hypotension/ arrhythmia).

2. If seizures are continuing after 10 minutes of loading dose of phenytoin/ fosphenytoin, give additional Phenytoin 5-10 mg/kg or 5-10 mg/kg phenytoin equivalent.
3. If seizures are continuing, Inj. Sodium valproate 25-35 mg/kg IV at the rate of 6 mg/kg/hour **Or**

Inj. Phenobarbitone 20 mg/kg IV at 60 mg/minutes (should be considered where ventilator facility is available as it can cause hypotension and respiratory depression).

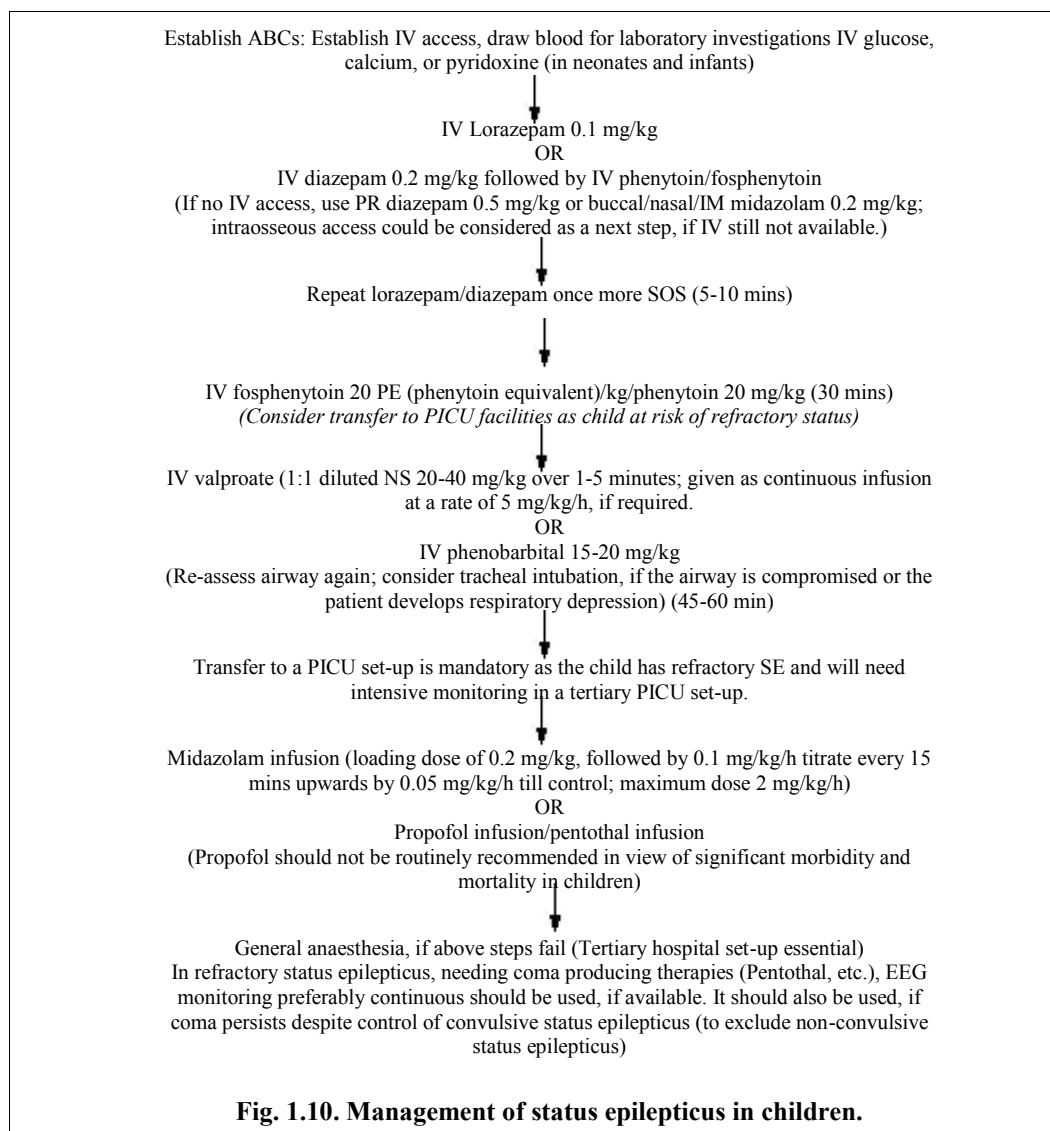
Once seizures are controlled, commence longer term AED with one of

Tab. Sodium valproate 800-1500 mg/day orally Or Tab. Phenytoin 300 mg/day orally Or Tab. Carbamazepine 400-1200 mg/day.

If status persists after 60 minutes (refractory SE): Identify the precipitating or underlying cause of SE and institute treatment accordingly and shift patient to a tertiary care hospital with ICU or emergency care unit having ventilation facility).

1. Prepare for mechanical ventilation, place EEG monitor, place arterial catheter and central catheter.
2. Give anaesthetic dose of Inj. Midazolam 0.2 mg/kg (max 10 mg) IV bolus over 2 minutes followed by 0.1-0.4 mg/kg/h continuous infusion. **Or**
Inj. Propofol 2.5 mg/kg IV bolus followed by 5-10 mg/kg/h. **Or**
Inj. Thiopental 10-20 mg/kg IV over one hour followed by 0.5 -1 mg/kg/h infusion.
3. Coma phase: Continue pharmacologic coma for 12 hour after last seizures with EEG goal of burst suppression.
4. Weaning phase: Reduce infusion of the anaesthetic agent every 3 hours with EEG monitoring, if there are no clinical or electrographic seizures, then wean off. If seizures recur, re-institute coma therapy with the same anaesthetic agent to which the seizures responded. Try to wean as outlined above, if there are no clinical or electrographic seizures for last 12 hours.
5. General measures: Identification and treatment of medical complications including

hyperthermia. Consider treating acidosis if pH 7.2 or if symptomatic in the form of cardiac conduction disturbances or haemodynamically unstable. Status epilepticus in children (See Fig. 1.10)



Non-convulsive status epilepticus (NCSE)

NCSE is less critical compared to convulsive status but requires ICU with facility for continuous EEG monitoring. General measures and investigation apply as described for GCSE. As the NCSE is more common in the elderly, non-anaesthetizing anticonvulsants may be tried.

Reference

1. Seizures and epilepsy. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp 3251-3270.
2. Expert Committee on Pediatric Epilepsy, Indian Academy of Pediatrics. Guidelines for diagnosis and

management of childhood epilepsy. Indian Pediatr. 2009;46:681-698.

3. Guidelines for management of Status Epilepticus in India. Indian Epilepsy Association 2008.

ASTHMA

A chronic inflammatory disease characterized by increased responsiveness of the airways to a number of stimuli resulting in their narrowing which is reversible spontaneously or with treatment.

Consider the diagnosis of asthma in patients with some or all of the following: Fig. 1.11.

Symptoms and Signs	
<p>Episodic/variable</p> <ul style="list-style-type: none"> • Wheeze • Shortness of breath • Chest tightness • Cough <p>Signs could be none (common) or wheeze—diffuse, bilateral, expiratory (+ inspiratory) and tachypnoea</p>	
Helpful additional information	
<ul style="list-style-type: none"> • Personal or family history of asthma or atopy (eczema, allergic rhinitis) • History of worsening after use of aspirin/NSAID ingestion, use of beta-blockers (including glaucoma drops) • Recognised triggers – pollens, dust, animals, exercise, viral infections, chemicals, irritants • Pattern and severity of symptoms and exacerbations 	
Indications for referral for specialist opinion/further investigation	Differential diagnoses in adults:
<ul style="list-style-type: none"> • Diagnosis unclear or in doubt • Unexpected clinical findings, e.g. crackles, clubbing, cyanosis, heart failure • Spirometry or PFTs don't fit in the clinical picture • Suspected occupational asthma • Persistent shortness of breath (non-episodic, or without associated wheeze) • Unilateral or fixed wheeze • Stridor • Persistent chest pain or atypical features • Weight loss • Persistent cough and/or sputum production • Non-resolving pneumonia • Severe eosinophilia 	<ul style="list-style-type: none"> • COPD • Cardiac disease • Tumour - laryngeal, tracheal, lung • Bronchiectasis • Foreign body • Interstitial lung disease • Pulmonary emboli • Aspiration • Vocal cord dysfunction • Hypertension • Aspergillosis <p>Differential diagnosis in children</p> <ul style="list-style-type: none"> • Episodic viral wheeze • Congenital heart disease • Aspiration - GERD, pharyngeal incoordination, tracheo-oesophageal fistula • Cystic fibrosis • Immunodeficiency • Immotile cilia syndrome

- | |
|---|
| <ul style="list-style-type: none"> • Consider chest X-ray in any patient presenting atypically or with additional symptoms |
|---|

Treatment

Nonpharmacological

Identify and avoid the trigger factor(s), stop smoking and do regular breathing exercises, e.g. 'Pranayama'. Reduce weight (for obese patients with asthma).

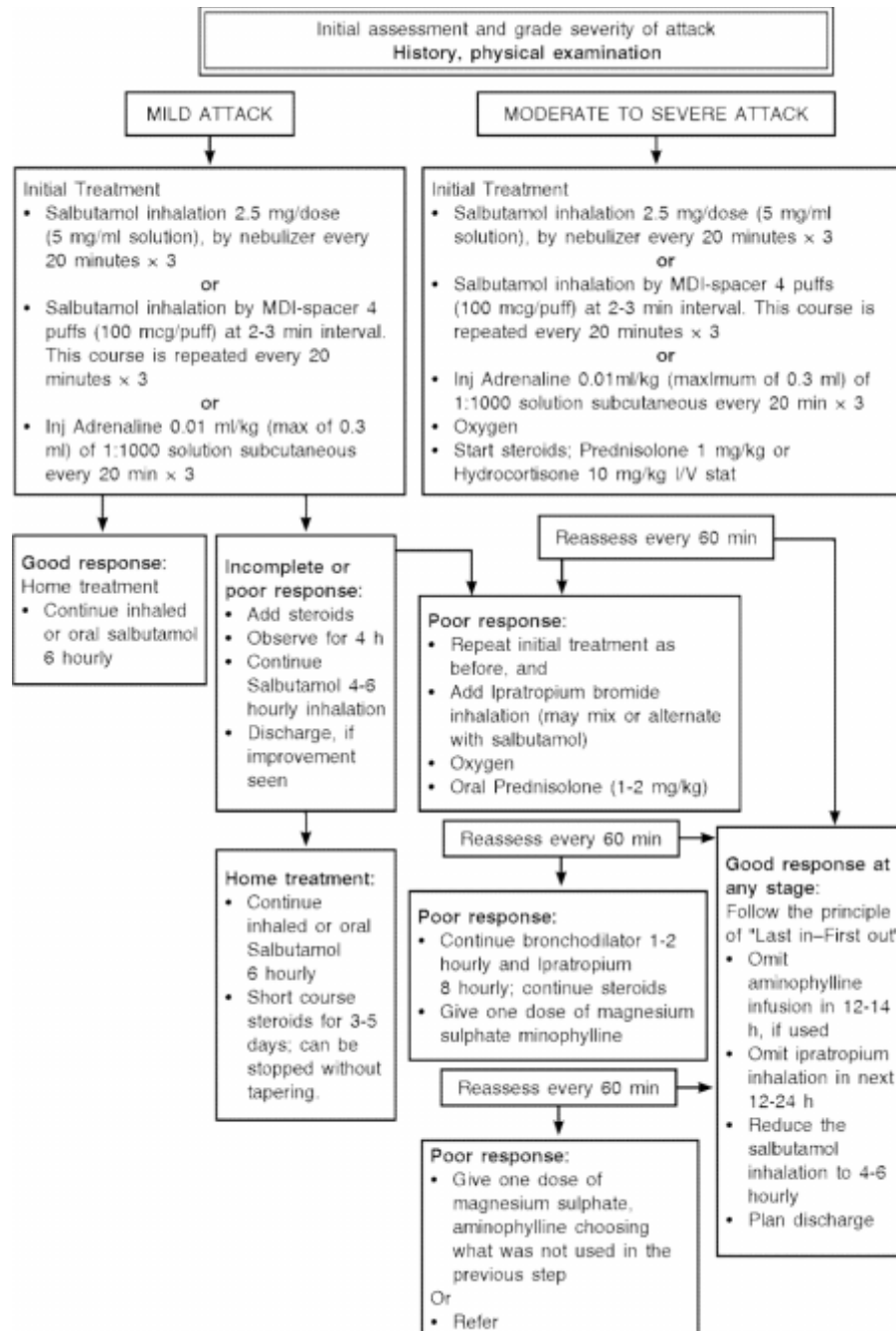


Fig. 1.12. Management algorithm for treating acute asthma in a hospital

Life-threatening asthma

Treatment of life-threatening episode should be immediate and no time should be spent on detailed clinical history.

- Oxygen inhalation 4 L/min to maintain SpO₂>90%.
- Inj. Terbutaline 10 mcg/kg subcutaneously or IV (maximum 40 mcg/day).
- Inhaled Salbutamol/Terbutaline preferably by nebulizer (as discussed above).
- Ipratropium Bromide 250 mcg by nebulizer with Salbutamol.
- Inj. Hydrocortisone 10 mg/kg IV. Inj. Aminophylline 5 mg/kg bolus slowly followed by 0.8-1.2 mg/kg/hour slow infusion (If patient has received theophylline preparation in last 72 hours; reduce bolus dose to 2.5 mg/kg).
- Inj. Magnesium sulphate 40 mg/kg in 50 ml 5% dextrose as slow infusion over 30 minutes can be considered.

If no response do arterial blood gas analysis, X-raychest and serum electrolytes. Intubate the patient if no or poor respiratory effort, increased carbon dioxide with respiratory acidosis. Transfer to intensive care unit as early as possible.

If above therapy fails. Transfer should be arranged so that oxygen and inhalation therapy can be continued on the way.

Notes:

- Antibiotics are required only if there is a consolidation, high grade fever or polymorphonuclear leucocytosis.
- Mere presence of crackles is not an evidence of pneumonia and does not warrant antibiotics.
- Mucolytics and cough syrups are not helpful.
- Sedation should be avoided in acute asthma.
- Non-sedating antihistaminics may be used, if associated allergic rhinitis is there.

Long-term management of asthma

Long-term asthma management depends on severity over a period of time. (Table 1.14).

Table 1.14. Assessment of severity of asthma

	Symptoms	Night time symptoms	PEFR
Step 4	Continuous	Frequent	≤ 60% predicted
Severe persistent	Limited physical activity	Variability > 30%	
Step 3	Daily use beta-2 agonist daily attack affects activity	>1 times a week	>60%<80% predicted
Moderate persistent		variability 20-30%	
Step 2	>1 times a week but	>2 times a month	≥ 80% predicted
Mild persistent	<1 time a day		variability 20-30%
Step 1	<1 time a week	<2 times a month	≥ 80% predicted
Intermittent	Asymptomatic and normal PEFR between attack	variability < 20%	

Treatment of Chronic Asthma

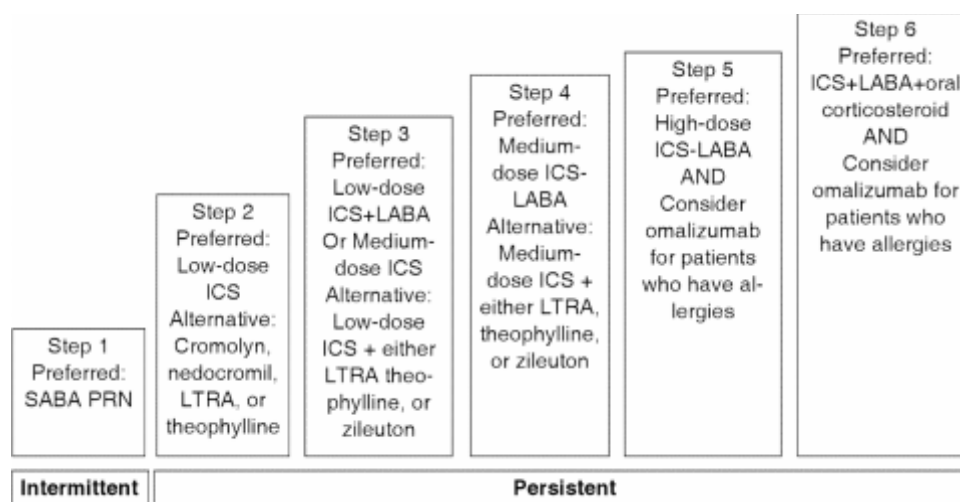


Figure 1.13 gives summary of stepwise management in adults; and in children aged 5-12 years.

SABA = short-acting beta₂-agonist; ICS = inhaled corticosteroid; LTRA = leukotriene receptor antagonist; LABA = long-acting beta₂-agonist.

Estimated equipotent daily dose of inhaled corticosteroids for adults and children older than 5 years.

Drug	Low daily dose (mcg)	Medium daily dose (mcg)	High daily dose (mcg)
Budesonide	200-400	>400-800	>800-1600
Fluticasone propionate	100-250	>250-500	>500-1000
Mometasone furoate	200	>400	>800

Note: Patients on high daily dose of ICS except for short periods should be referred to a specialist for assessment to consider alternative combinations of controllers. Maximum recommended doses on prolonged use are associated with increased risk of systemic side effects.

Fig. 1.13. Summary of stepwise management.

References

1. Pocket Guide for Asthma management and Prevention (for adults and children older than 5 years). Global Initiative for Asthma. 2011.
2. The British Guidelines on Management of Asthma: A National Clinical Guideline. British Thoracic Society, Scottish Intercollegiate Guidelines Network, 2012.
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CARDIOPULMONARY RESUSCITATION (CPR)

CPR consists of a series of manoeuvres by which oxygenated blood supply to brain and vital organs is maintained during cardiopulmonary arrest (CPA), i.e. cessation of respiration and circulation.

Diagnosis of cardiopulmonary arrest

Cardiac arrest

1. Absence of pulse in major arteries (carotid or femoral in older children and femoral or brachial in infants as carotid is difficult to palpate due to short neck).
2. Absence of heart sounds on auscultation.
3. Asystole /ventricular fibrillation on ECG.

Respiratory arrest

Absence of respiration on looking (absent chest movements), listening (absent air flow on bringing ears in front of mouth) and feeling (absent air flow on keeping hands in front of mouth or nose).

Levels of CPR. There are two levels of CPR:

1. **BLS (basic life support).** The elements of CPR provided without additional equipment. Skill and speed are most essential.
2. **ACLS (advanced cardiac life support).** Use of equipment and drugs for assisting ventilation or circulation.

BASIC LIFE SUPPORT (BLS)

a. Circulation

- Call for help.
- Position the victim supine on firm flat surface with head level with the heart.
- Initiate chest compressions before ventilation. “**Push Hard and Fast**” on the centre of the chest. Continue this cycle of 30 compressions and 2 breaths.
- In a **newborn**, (Fig. 2.4) 2 thumbs are positioned side by side on sternum just below the nipple line, with fingers encircling chest and supporting the back and compress sternum by 1.2 cm (120/min). For details, see section on Newborn Care, Chapter 19.
- In an **infant**, compress the sternum with 2 fingers placed just below the intermammary line. 2 fingers (index, middle) to compress sternum by at least 4 cm at the rate of at least 100/min and do not lift the finger, when compression is released. Two thumb-encircling hands technique can also be used.
- In **children, (1 year- up to the start of puberty)** use heel of hand on lower half sternum

with long axis of heel same as long axis of sternum and compress at least 2 inches (5 cm) at the rate of at least 100/min.

- **In adults**, the heel of one hand is placed on the lower sternum and the other hand placed on top of the first. The elbows should be locked in position with the arms straight and the shoulders over the hands. Sternum should depress by at least 2 inches (5 cm) and the rate of compression at least 100/min.
- Allow for complete chest recoil after each compression and minimize interruptions in chest compressions. (Caution: Do not exert pressure on the ribs, costal cartilages or xiphoid)

b. Airway

- Clear airway by cleaning blood, secretions, foreign particles (suction, if available).
- Prevent posterior displacement of tongue due to muscle relaxation during CPA, by head tilt and chin lift or jaw thrust (may use an airway if available).
- **Head tilt**: Put a hand at forehead and tilt head back to sniffing or neutral position in an infant and little more in older children and adults.
(**Caution**: In a patient with suspected cervical spine injury, head tilt should be avoided)
- **Chin lift**: Put finger of other hand under bony part of lower jaw at chin and lift chin upward.
- **Jaw thrust**: Place 2-3 fingers under each side of lower jaw at its angle and lift jaw upward with the elbow resting on the surface on which victim is lying

c. Breathing

- Rescue breaths be given in approximately 1 second every 6 to 8 seconds (about 8-10 breaths per minute) by mouth to mouth/nose/mask/airway breath (may use bag and mask, if available)
- Avoid excessive ventilation, with enough volume to produce visible chest rise.
- Inhale and then make a seal around the mouth and nose together in an infant and seal mouth only in older children and adults (nose pinched with the hand used for head tilt) to exhale smoothly. Avoid delivering breaths that are too large or too forceful.
- Once advanced airway is in place, continue chest compressions at the rate of at least 100/min.

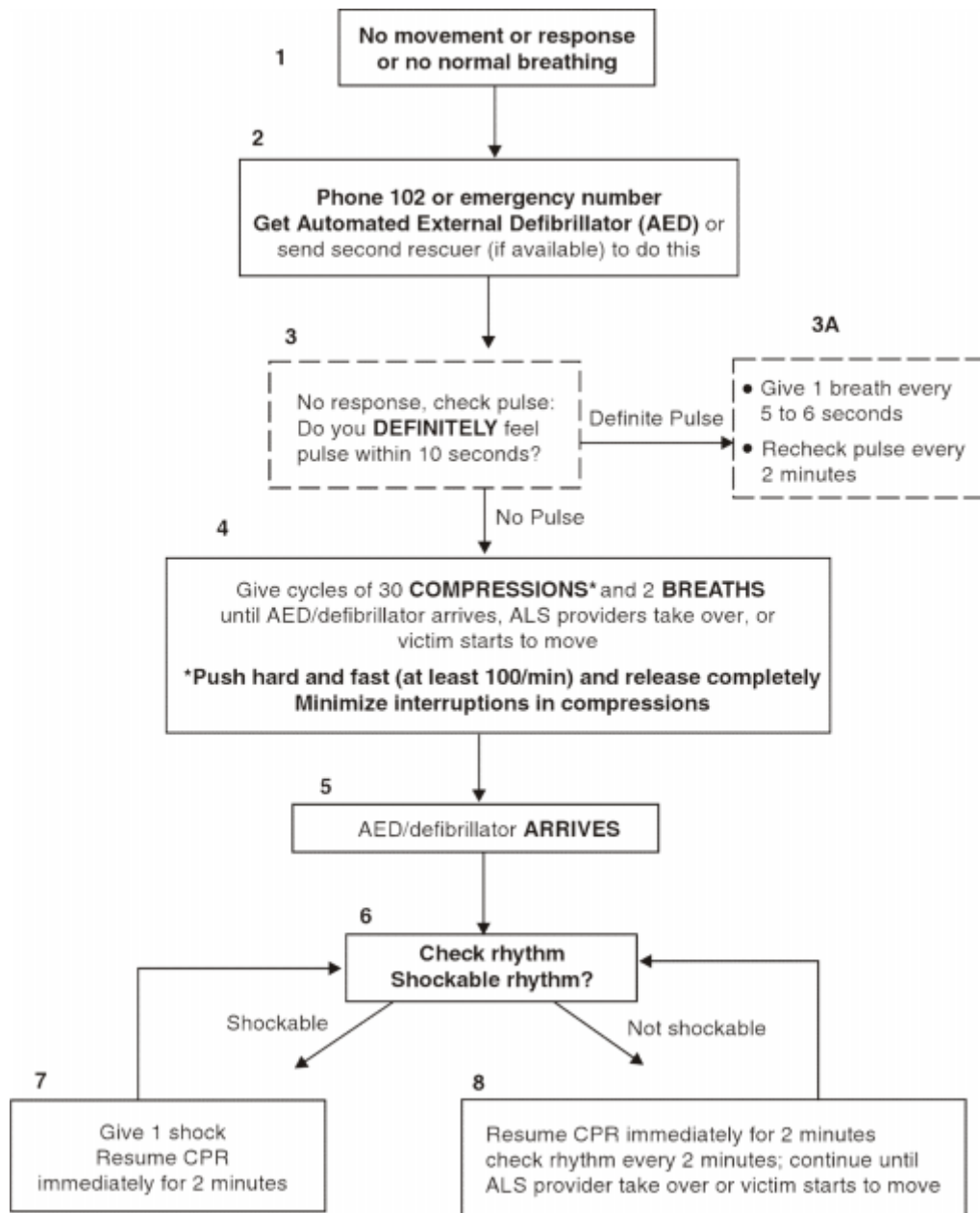
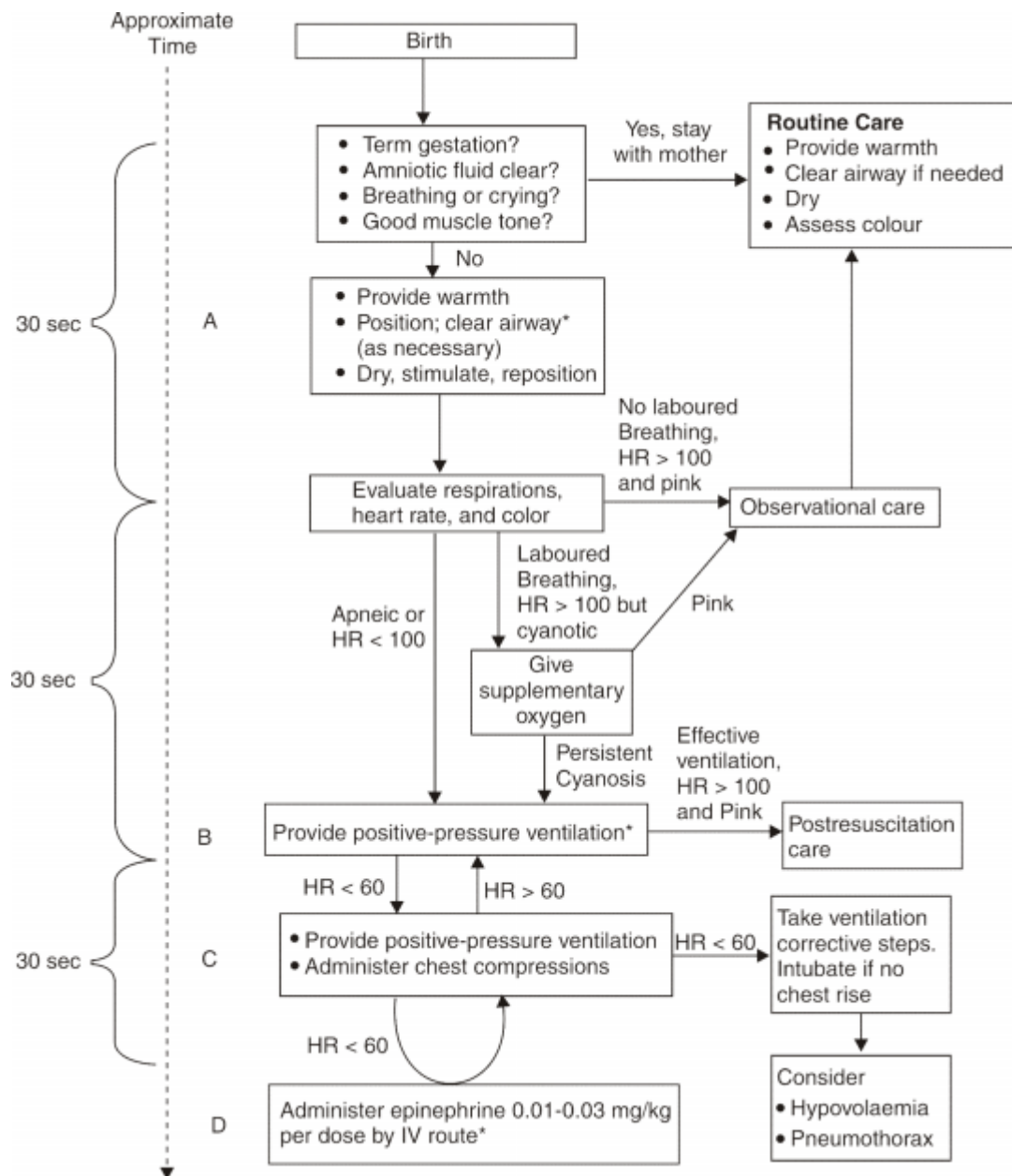


Fig. 2.2. Adult BLS healthcare provider algorithm

* Compression depth at least 2 inches (5 cm)

Note: Boxes bordered with dotted lines indicated actions or steps compression depth at least 2 inches (5 cm) performed by the health care provider but not the lay rescuer.



ADVANCED CARDIAC LIFE SUPPORT (ACLS)

If ACLS facility is available, shift the patient to ACLS as soon as possible. If this is not available, then continue cardiac massage till spontaneous HR is more than 60-80/min and continue artificial breathing till adequate respiratory efforts are present (good chest movement, no cyanosis or shock). The

management of cardiac arrest is highlighted in the ACLS algorithm (Figs 2.5 & 2.6).

Do not interrupt compressions and delay shock for accessing vascular access, drug delivery, advanced airway placement.

Inj. Naloxone

Indication: Narcotic overdose or poisoning and newborn resuscitation (if mother has been given morphine or pethidine during labour. For details see section on Opioid Poisoning).

Dose and route: 0.1 mg/kg IV.

Inj. Sodium bicarbonate (NaHCO₃)

Indication: Hyperkalaemia, significant metabolic acidosis (pH <7.2) or prolonged CPR.

In adults and in children: Inj. Sodium bicarbonate 1 mEq/kg stat and 0.5 mEq/kg every 10 minutes in protracted resuscitation.

Inj. Calcium

Indication: hyperkalaemia, hypocalcaemia or calcium channel blocker toxicity.

Dose and route: In children, 0.5 ml/kg of calcium gluconate IV. In adults, 10 ml to be given as a slow infusion under ECG monitoring.

Inj. Glucose

Indication: Hypoglycaemia.

Dose and route: 0.5-1 g/kg IV and maintain blood sugar around 140 to 180 mg/dL.

Get ABG, serum electrolytes and blood sugar (dextrose stick/glucometer)

Monitoring

Pulse should be palpable and chest expansion should be seen during effective CPR. Blood pressure, SpO₂, Et CO₂ (in intubated patient and if facility available), ABG should be monitored during and soon after CPR.

Maternal cardiac arrest

To relieve aortocaval compression during chest compressions and optimize the quality of CPR, it is reasonable to perform manual left uterine displacement in the supine position first. Left uterine displacement can be performed from either the patient's left side with the 2-handed technique or the patient's right side with the 1-handed technique, depending on the positioning of the resuscitation team. If this technique is unsuccessful, and an appropriate wedge is readily available, then providers may consider placing the patient in a left-lateral tilt of 27° to 30°, using a firm wedge to support the pelvis and thorax.

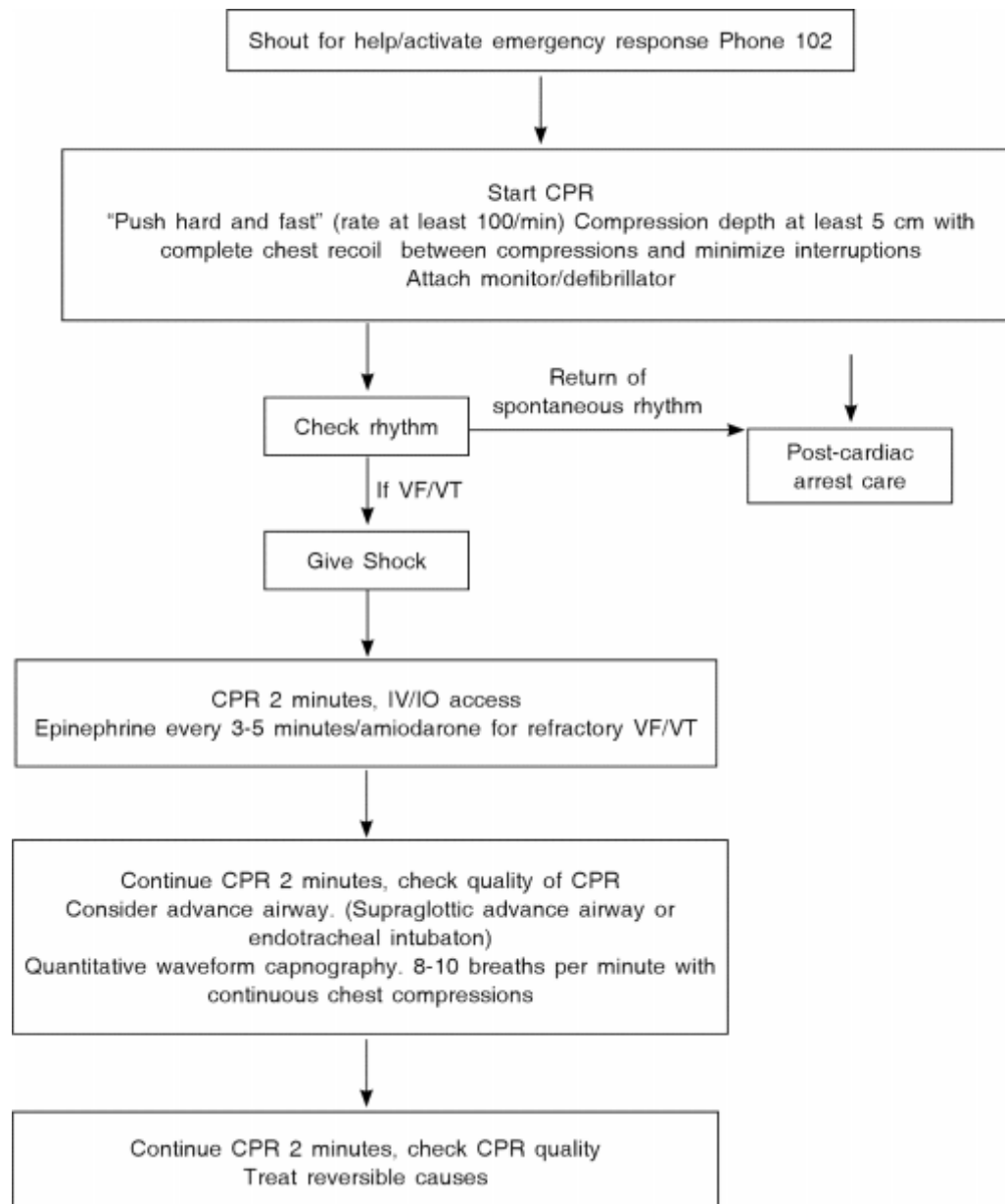
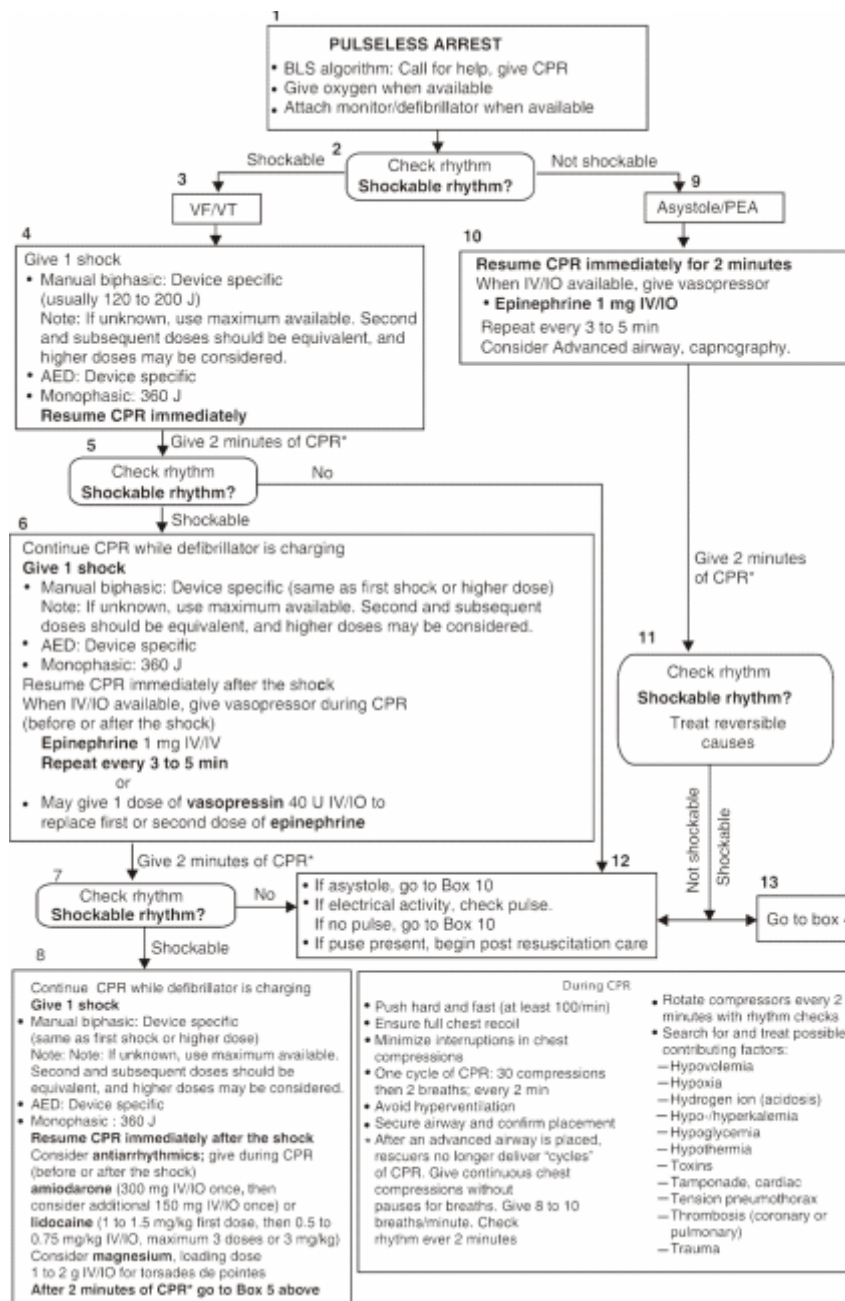


Fig. 2.5. ACLS in adults



Reversible causes are hypovolaemia, hypoxia, acidosis, hypo-/hyperkalaemia, tension pneumothorax, tamponade, toxins, thrombosis; VF – ventricular fibrillation; VT – ventricular tachycardia; PEA – pulseless electrical activity.

Fig. 2.6. Adult cardiac arrest algorithm.

References

1. American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation 2010; 122: 18 Supplement 3.
2. Cardiovascular Collapse, Cardiac Arrest and Sudden Cardiac Death. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp 2238-2246.
3. Facility Based IMNCI (F-IMNCI) Participants Manual. WHO, UNICEF, and Ministry of Health & Family Welfare, Government of India, 2009.

ANAPHYLAXIS

It is a generalized hypersensitivity reaction to food, inhaled/ingested allergens or drugs.

Clinical Features

- Stridor and wheezing due to laryngeal oedema, lower airway oedema (asthma) or both. Rhinitis
- Patient can deteriorate over a brief period of time (½ to 3 hours).
- Cardiovascular collapse (hypotension)
- Gastrointestinal - abdominal pain, vomiting and diarrhoea.

Table 2.2. Commonly used agents implicated in anaphylactic and anaphylactoid reactions

1. Antibiotics <ul style="list-style-type: none"> • Penicillin and analogs • Tetracycline • Sulfonamides • Streptomycin 	6. Diagnostic agents <ul style="list-style-type: none"> • Iodinated radiocontrast agents
2. Local anaesthetics <ul style="list-style-type: none"> • Inj. Lidocaine 	7. Venoms <ul style="list-style-type: none"> • Bees, wasps, spiders, jellyfish
3. General anaesthetics and muscle relaxants <ul style="list-style-type: none"> • Inj. Thiopental • Inj. Tubocurarine 	8. Hormones <ul style="list-style-type: none"> • Inj. Insulin • Pituitary extracts • Inj. Hydrocortisone • Vasopressin
4. Non-steroidal anti-inflammatory agents	9. Extracts of allergens used for desensitization
5. Blood products and vaccines <ul style="list-style-type: none"> • Red blood cells, white blood cells, platelet transfusions • Gamma globulin • Snake and spider antivenoms • Rabies • Diphtheria • Tetanus • Inj. Dextran 	10. Food <ul style="list-style-type: none"> • Eggs • Nuts • Milk and milk products • Shellfish • Legumes (peanuts, soyabeans, kidney beans, chick peas) • Citrus fruits
	11. Other drugs <ul style="list-style-type: none"> • Protamine • ACE inhibitors • Parenteral iron

Treatment

1. Initial management should be directed at the CAB of resuscitation, namely maintenance of adequate airway—suction, breathing, and circulation. (For details see chapter on Cardiopulmonary Resuscitation).
2. **Inj. Adrenaline** 1:1000, 0.01 ml/kg (maximum 0.2 ml in children and 0.5 ml in adults) by IM injection. If necessary, dose can be repeated every 5-15 minutes. If the anaphylaxis is to injection of an allergen extract or to a hymenoptera sting into an extremity, half the dose of adrenaline can be infiltrated locally, subcutaneously after dilution with 2 ml saline.
A tourniquet above the site slows systemic distribution of allergen. It should be loosened every 3 minutes.
Administer IV adrenaline, if anaphylaxis appears to be severe with life-threatening manifestations (1:10,000) 0.1 mg IV slowly over 5 minutes. An IV infusion at rates of 1 to 4 mcg/min may prevent the need to repeat adrenaline injections frequency. (**Caution:** Close monitoring is critical)
3. Establish one or preferably two, wide bore intravenous lines. Commence rapid fluid resuscitation with normal saline.
4. If there is severe laryngeal obstruction, bronchospasm, circulatory shock or coma, intubate and commence intermittent positive pressure ventilation.
5. If the only manifestation of anaphylaxis is urticaria or angioedema, initial IM dose of adrenaline should be given in addition to Ranitidine. If no progression occurs, patient can be kept under observation for at least 12 hours and then discharged.

Additional measures

1. Administer Salbutamol or Terbutaline by aerosol or nebulizer, if bronchospasm is a major feature. Inhaled Ipratropium may be especially useful for treatment of bronchospasm in patients receiving beta blockers.
2. Inj. Diphenhydramine 1 mg/kg slow intravenously.
3. Inj. Ranitidine 1 mg/kg slow intravenously.
4. Inj. Hydrocortisone 2-6 mg/kg or Dexamethasone 0.1-0.4 mg/kg IV early in the course of therapy. Beneficial effects are delayed by at least 4 to 6 hours.

References

1. Urticaria and Angioedema. In: Dermatology in General Medicine. Freedberg IM et al (eds), 5th edition, The McGraw Hill Company Inc., pp.1409.
2. Facility Based IMNCI (F-IMNCI) Participants Manual. WHO, UNICEF, and Ministry of Health & Family Welfare, Government of India, 2009.
3. American Heart Association Guidelines for Anaphylaxis, Circulation 2010; 212: S829-S861.

BURNS

Burns can be caused by dry heat or space heating, moist heat-scalds and fat burns, ionizing radiation, electric burns, friction, chemicals and cold-frost bite

Clinical Features

- Pain, anxiety
- Fluid loss and dehydration,
- Local tissue oedema and infection.
- Shock, toxæmia,
- GIT - sloughing of mucous membranes and haematemesis (Curling ulcer)
- Respiratory tract inhalation injuries
- Acute renal failure,.
- Late complications - protein losing enteropathy, secondary haemorrhage, hypertrophic scar/keloid and contracture.

Treatment

Burns are characterized by degree and amount of body surface area (BSA).

Minor burns, as well as second-degree burns covering less than 15% of adult's (10% in children) body surface area (BSA), may be treated at home or in a doctor's office as follows:

1. Cool the burn by holding the burn under cold running water for around 5 minutes or until the pain dips, or immersing the burned area in cold water or cooling it with cold compresses. Never put ice on the burn.
2. Cover the burned area with a sterile gauze bandage or clear moist towels: Don't use fluffy cotton, as it may irritate the skin. Wrap the gauze loosely to avoid putting pressure on the wound. Bandaging the burned skin keeps air away from the injury.
3. Don't break or prick blisters.

For major burns- first- or second-degree burns covering more than 25% of adult's (> 20% in children) BSA, or a third-degree burn on >10% BSA follow these steps:

1. Begin CPR if required. (see section on Cardiopulmonary Resuscitation in Chapter 2).
2. Don't remove burnt clothing. However, do ensure that the victim is no longer in contact with burning materials or exposed to smoke or heat.
3. Don't immerse victims with critical large burns in cold water. Doing so may cause shock.
4. Cover the area of the burn with a moist, cool, sterilized bandage or clean, moist cloth or moist towels.

Immediate resuscitation and care in hospital

- Clear airway. Suspect inhalation injury, if history of being trapped in close space and facial burns, stinging of eyebrows/nasal hairs, respiratory distress, hoarseness of voice or stridor, altered consciousness and soot in sputum are present.
- Check for breathing and circulation and provide support.
- Rule out other associated injuries.

Assess the severity of burns by Rule of nine chart in adults/ Rule of five chart in children.

Criteria for admission or transfer to a burns centre:

- Burns of more than 20% body surface area in an adult.

- Burns of more than 10% body surface area in a child under 10 or adult over 50 years.
- Burns of more than 5% body surface area in an infant.
- Burns of head, face, neck or perineum.
- Respiratory burns or inhalation injury.
- Circumferential burns.

Transfer should be done in a fully equipped ambulance with secured airway and circulatory support.

General Management

1. Fluid resuscitation-

- Intravenous fluids to be infused through a wide bore cannula (lactated Ringer's solution/NS) at the rate of 4 ml/kg/% burns area. Half of the volume calculated is infused in the first 8 hours after the injury and the rest is infused in the next 16 hours (for details see respective section on fluid and electrolyte imbalance in adults and children).
- Adequacy of the fluid therapy is best assessed by measuring hourly urine output, which should be maintained at 30-50 ml per hour in adults and 0.5-1 ml/kg body weight in children..
- Amount of fluid: In first 24 hours give 4 ml/kg/% of burn, in next 24 hours give 2 ml/kg/% of burn. Other features to be assessed are pulse rate, respiratory rate, blood pressure and level of consciousness.

2. Pain relief

Cold compresses using fresh running water; avoid ice cold water.

Inj. Morphine sulphate (15 mg/ml) 10-15 mg stat and can be repeated after 4-6 hours.

Or Inj. Pethidine 25-100 mg SC or IM route (In children 0.5-2 mg/kg IM)

Or Inj. Pentazocine 30 mg (for severe pain 45-60 mg) IM or IV (In children over 1 year 1 mg/kg IM or SC; by IV up to 500 mcg/kg) every 3-4 hours when necessary.

3. Care of the burns

- Clean the burns with running water except for the chemical burns.
- Remove clothes, dirt, and eschar.
- Dressing: Aims to minimize pain, absorb exudates and debris, shield the burns from secondary infection and provide protection during transport.
- Application of Silver sulphadiazine 1% or Silver nitrate or Framycetin 1%.
- Fasciotomy in cases of circumferential burns in extremities or chest wall.
- In case of airway burns keep endotracheal tube ready by bedside .
- Place nasogastric tube in major burns .
- Place urinary catheter in all major burns and record hourly urine output. Titrate fluid to maintain urine output as above.

4. Inj. Ampicillin 500 mg 6 hourly IV

In children, 50-100 mg/kg in 4 divided doses for 7-10 days.

Or

Inj. Ciprofloxacin (infusion 100 mg/50 ml), 500 mg 2 times a day for 7 days.

Patient is advised to attend physiotherapy: Use compression garments to prevent hypertrophic scars. Plastic surgeon's advice may be required to correct contractures.

Scalds

Scalds may result from drinking extremely hot fluids or some irritant chemicals. In such cases, the inner side of the mouth and throat becomes red and swollen. Give cold water to drink or ice, followed by milk or egg emulsion to drink and refer the patient to a hospital.

References

1. Principle and Practice of Burn Management. Settle John AD (ed). Churchill Livingstone, New York, 1996.
2. First Aid During Emergency. National Portal of India. www.India.gov.in accessed on 10.9.1

SHOCK

Shock is a state of acute circulatory failure that leads to tissue hypoxaemia

Clinical Features

- **Early compensated shock:** BP normal, tachycardia and hypotension. Skin is cold and clammy, increased capillary refill time (>3 sec).
- **Decompensated shock:** Fall in BP and cardiac output, alteration of mentation, oliguria and myocardial ischaemia, acrocyanosis, cold and damp extremities and a pale look.
- **Irreversible shock:** progressive organ failure.

Classification and causes of shock

1. Haemorrhagic shock

Table 2.3. Causes of haemorrhagic shock

Traumatic	Non-traumatic
<ul style="list-style-type: none">➤ Blunt or penetrating injury➤ Fractures specially of long bones and pelvic fractures	<ul style="list-style-type: none">➤ GI bleeds➤ Aortic dissection/Rupture of aneurysm➤ Erosion of a large vessel, e.g. in pancreatitis or due to tumour infiltration➤ Diffuse inflammation of mucosal surfaces, e.g. ulcerative colitis

2. Hypovolaemic shock

- Fluid loss from vomiting and/or diarrhoea, e.g. in cholera, other GI infections.
- Fluid loss in diabetes mellitus, adrenal insufficiency, excessive sweating, exfoliative dermatitis, diabetes insipidus, reaccumulation of ascites after tapping.
- Sequestration of fluid, e.g. in intestinal obstruction, pancreatitis.
- Burns.

- Crush injuries.

3. **Cardiogenic**

- Acute MI
- Cardiomyopathy.
- Cardiac arrhythmias.
- Mechanical causes, e.g. valvular disease, outflow tract obstruction, ruptured ventricular septum.

4. **Distributive or vasogenic (relative hypovolaemia)**

- Septic shock; toxic shock syndrome. Anaphylactic.
- Neurogenic.

Treatment (stepwise management)

1. Immediately start oxygen therapy 4-6 L/min.
2. Establish 2 wide bore IV lines and infuse crystalloids.
3. Nature of fluids: Normal saline/Ringer's lactate (crystalloids) can be used initially in all types of hypovolaemic/haemorrhagic shocks. Colloids are used in conditions with capillary leaks, burns, dengue fever, nephrotic shock. Whole blood can be used as replacement in cases of trauma and haemorrhagic shock; packed cells are used in burn patients.
4. Volume of fluids: Boluses of 20 cc/kg should be pushed in 5-7 min to restore blood volume quickly through 3 way cannula. Give a 2nd bolus if required.

5. **Use of Inotropes**

Inotropes are used to increase myocardial contractility. Dose of dopamine/dobutamine generally required is 5-10 mcg/kg/min, can be augmented to 20 mcg/kg/min (Table 2.4).

Preparation of catecholamine infusions in infants and children can be done by following formula:

For Dopamine and Dobutamine, $6 \times \text{body weight in kg}$ is the dose added to sufficient diluent to create a total volume of 100 ml. 1 ml/h of this fluid will deliver 1 mcg/ kg/min. For adrenaline, $0.6 \times \text{body weight in kg}$ is used in similar diluent to deliver 0.1mcg/kg/min.

Metabolic corrections

Correction is indicated only when marked acidosis (pH <7.2) is present. Sodium bicarbonate 1-2 mEq/kg can be used initially but subsequent doses should be based on base deficit (mEq = body weight in kg \times base deficit \times 0.3).

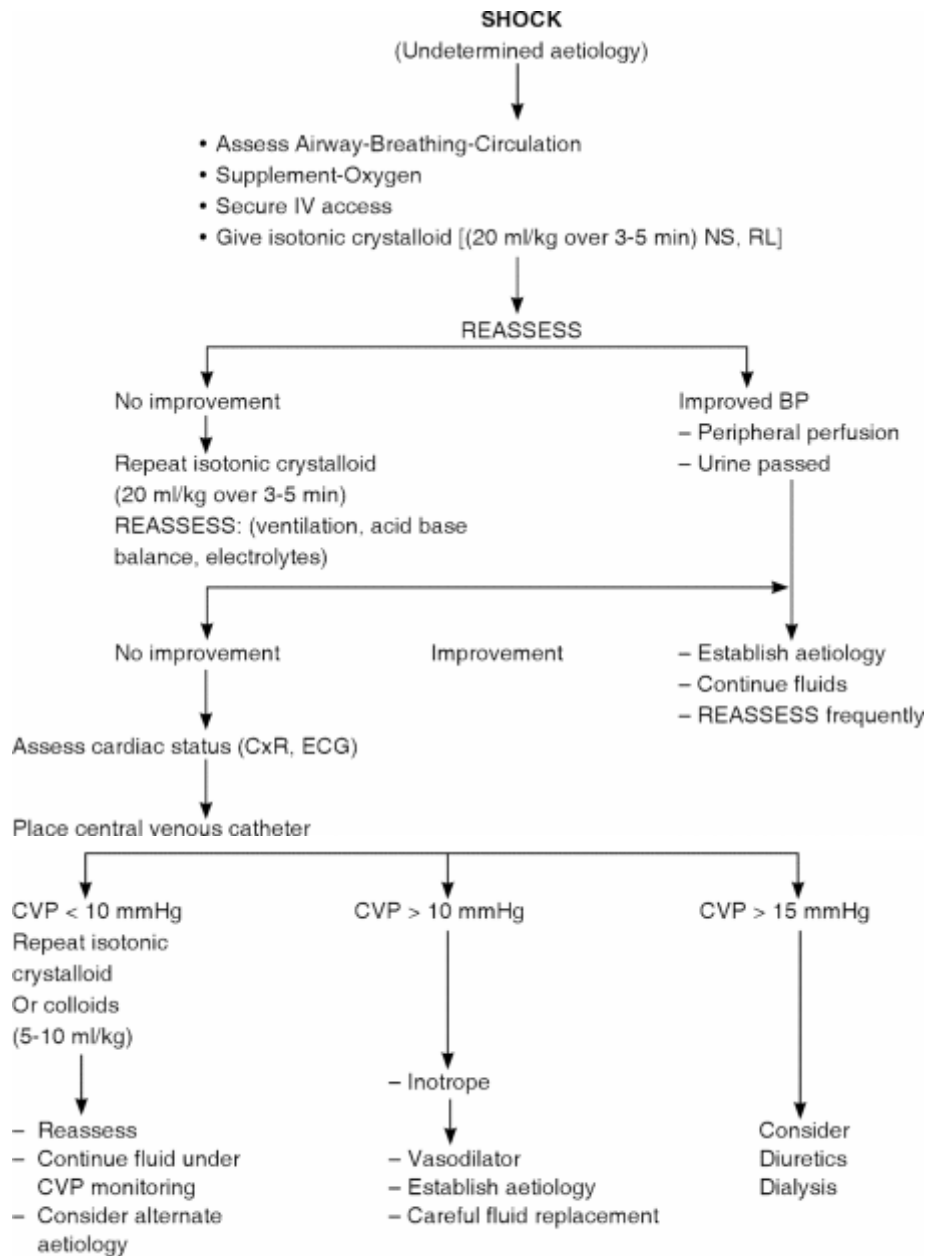


Fig. 2.7. Schematic outline of initial resuscitation of shock.

Table 2.4. Cardiovascular support drugs

Drugs	Dose	Comment
Dopamine	5-20 mcg/kg/min	Effects are dose related and complex
Dopamine	5-15 mcg/kg/min	Selective inotrope, little chronotropic, mild vasodilator
Adrenaline	0.5-1.0 mcg/kg/min	powerful vasoconstrictor, minimum increase in heart rate, used if other agents have failed
Noradrenaline	0.5-1.0 mcg/kg/min	strong vasoconstrictor, mainly useful for prolonged hypotension, not responding to other agents

Note: Titrate infusion to desired haemodynamic effect.

Cardiogenic shock

Patient should be referred to a tertiary level centre after initial resuscitation (See section on arrhythmia, myocardial infarction for specific treatment).

Septic shock

More and aggressive antibiotic therapy should be started early. Disseminated intravascular coagulation (DIC) is a common complication and may require fresh frozen plasma and platelet transfusion (see section on septicemia for specific treatment).

For anaphylactic shock, see section on Anaphylaxis.

References

1. Approach to Patients with Shock. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; 1689-1695.
2. Facility Based IMNCI (F-IMNCI) Participants Manual. WHO, UNICEF, and Ministry of Health & Family Welfare, Government of India, 2009.
3. Shock. In: Nelson's Textbook of Paediatrics. Behrman RE, Kleigman RM, Jenson HB (eds), 19th Edition, WB Saunders, 2011; pp. 305-314.

FLUID AND ELECTROLYTE IMBALANCE AND REPLACEMENT (IN ADULTS)

For life-threatening electrolyte imbalance in children, see Chapter 19.

Disturbances in fluid and electrolyte are common following burns, trauma and major surgery

Volume changes: volume deficit

I. Obvious causes

- GIT -Vomiting, diarrhoea, intestinal fistulae, nasogastric suction
- Fluid loss following burns
- Sequestration of fluid in soft tissue injuries and infections
- Diuretics
- Renal disease/ adrenal insufficiency.

II. *Less obvious causes*

- Unsuspected inadequate fluid intake.
- Excessive heat loss as in sweating in high fever, hot humid temperature.
- Haemodialysis.
- Haemofiltration from surgical incisions.
- Diseases like tetanus.

Diagnosis

- Clinical signs of dehydration
- Serum electrolytes

Management

A. *Replacement fluids*

1. Only crystalloid solutions with a similar concentration of sodium to plasma (normal saline or balanced salt) solutions (Ringer's lactate or Hartmann's solutions) are effective as replacement fluids. Fluid and electrolyte requirements in adults and children are shown in Table 2.5.
2. Crystalloids should be infused in a volume at least three times the volume lost in order to correct hypovolaemia.
3. Colloid solutions (albumins, dextran, gelatins and hydroxyethyl starch solutions) should be infused in a volume equal to the blood volume deficit.

Oral and nasogastric fluids: Oral rehydration can often be used in mildly hypovolaemic patients, if the oral route is not contraindicated. Do not use, if:

- The patient is unconscious.
- The patient has gastrointestinal lesions or reduced gut motility e.g. obstruction.
- General anaesthesia and surgery is planned imminently.

WHO/UNICEF formula for low osmolarity oral rehydration fluid:

Dissolve in one litre of drinkable water

Sodium chloride	2.6 g/L
Trisodium citrate, dihydrate	2.9 g/L
Potassium chloride	1.5 g/L
Glucose anhydrous	13.5 g/L

Resulting concentrations

Na⁺ 75 mmol/L, Cl⁻ 65 mmol/L, K⁺ 20 mmol/L, Glucose anhydrous 75 mmol/L, Citrate 10 mmol/L, Total osmolarity 245 mmol/L.

B. *Maintenance fluids*

Maintenance fluids are fluids used to replace the normal physiological loss that occurs in a patient through skin, lung, faeces and urine. All maintenance solutions are crystalloid solutions. Some examples of crystalloids that are suitable as maintenance fluids are: 50% dextrose and 4% dextrose in sodium chloride 0.18%.

Table 2.5. Fluid and electrolyte requirements for adult and children under normal circumstances

Weight	Fluid (ml/kg/24 h)	Sodium (mmol/kg/24 h)	Potassium (mmol/ kg/24 h)
Children			
First 10 kg	100 (4*)	3	2
Second 10 kg	50 (2*)	1.5	1
Subsequent kg	20 (1*)	0.75	0.5
Adults			
All weights (kg)	35(1.5*)	1	0.75

*These figures represent the fluid requirements in ml/kg/hour.

Safety

Before giving any intravenous infusion:

1. Check that the seal of the infusion fluid bottle or bag is not broken.
2. Check the expiry date.
3. Check that the solution is clear and free from visible particles.

VOLUME EXCESS

Volume excess is often iatrogenic, as in excessive intravenous infusions of saline, and blood transfusions. Renal insufficiency, congestive heart failure, liver disease and other causes of sodium retention, or excessive sodium administration can all produce increase in extracellular fluid content and hypervolaemia.

Clinical features

- Oedema, ascites.
- Pleural effusion, pulmonary congestion.
- Neck veins full.
- Hyperdynamic circulation with tachycardia, a warm skin, and a bounding pulse. Increase in the systolic pressure and pulse pressure.
- CVP >12 mmhg, pulmonary capillary wedge pressure (PCWP) >20 mmhg in the presence of pulmonary oedema.

Treatment

- Salt restriction, restriction of fluid intake and the use of
- Frusemide as a diuretic.
- Phlebotomy (in fulminant pulmonary oedema) in stages so that PCWP is reduced below 15 mmHg.

References

1. Anaesthesia at the District Hospital. In: World Health Organization in collaboration with the World Federation of Societies of Anesthesiologists, Geneva, 2nd Edition, World Health Organization, 2000.
2. Life Threatening Electrolyte Abnormalities. Circulation 2005; 112: IV-121-I

STRIDOR

Common causes of stridor in children are: (i) Congenital laryngomalacia, (ii) Croup (acute laryngitis, laryngotracheobronchitis, epiglottitis); In adults, are: (i) Croup, (ii) allergies and (iii) tumours. Sudden onset of stridor may be caused by aspiration of a foreign body. Other causes include peritonsillar, retropharyngeal abscesses, angioedema and hypocalcaemic tetany.

Clinical Features

- Noisy respiration primarily during inspiration produced by turbulent airflow through narrowed air passages.
- Respiratory distress, restlessness and cyanosis are features of severe airway obstruction.

Treatment

Treatment of common causes of stridor is discussed below in four sections:

- A. Acute laryngitis/laryngotracheobronchitis
- B. Spasmodic croup
- C. Epiglottitis
- D. Diphtheria

A. Acute laryngitis, laryngotracheobronchitis (croup)

Acute infection of the larynx usually caused by viruses

Nonpharmacological

- Maintain airway by positioning the patient in lateral position with neck slightly extended.
- Gentle suction of secretions, if required.
- Oxygen by ventimask/hood at the rate of 4-6 L/min.
- Endotracheal intubation/ tracheostomy may be done to prevent respiratory failure.

Pharmacological

Mild cases with minimal stridor -voice rest, feeding and fluids only with clear instructions on when to report immediately.

Moderate (stridor at rest) and severe cases (to be hospitalized immediately) need specific therapy in the form of:

1. **Inj. Dexamethasone** 0.6 mg/kg IM stat or oral Prednisolone 1-2 mg/kg
2. **Inhaled Adrenaline** 0.01 - 0.05 mg/kg/dose to be diluted in 3 ml saline every 1-2 hours. A few doses can be administered until side effects, viz. tachycardia, tremors, etc. appear.

Or

Inhaled Budesonide 500-1000 mcg/dose 12 hourly till response is seen.

3. Intravenous fluids maintenance dose (see respective section on fluids and electrolytes in adults and children).
4. Oxygen therapy

5. Intubation or tracheostomy in children with incipient obstruction (such as severe indrawing of the lower chest wall and restlessness).

Antibiotics are not recommended.

B. Spasmodic croup

It occurs most commonly in children 1-3 years of age. It is possibly allergic and recurrent and occurs more often in the evening or night time. It has sudden onset, preceded by mild coryza and hoarseness. Symptoms usually diminish within few hours.

Taking out the child with spasmodic croup in fresh air may decrease the airway obstruction.

C. Epiglottitis

Usually caused by *H. influenzae* and is a potentially life-threatening condition. Lateral X-ray of soft tissue neck may show swollen epiglottitis (thumb sign). It is a medical emergency; airway and specific therapy must be introduced aggressively.

Treatment

1. Nonpharmacological treatment as above in acute laryngitis.
2. Inj. Cefotaxime 100 mg/kg/day divided into 3 doses.

Or

Inj. Ceftriaxone 100 mg/kg/day (maximum dose 4 g/day) in 2 divided doses. If cephalosporins not available Tab. Chloramphenicol 500 mg 6 hourly.

In Children 100 mg/kg/day divided into 6 hourly doses.

D. Diphtheria

It is usually seen in non-immunized children.

- Presents as stridor but laryngeal examination may show a membrane-like structure (pseudomembrane), removal of which leads to bleeding.
- Large cervical lymph nodes (bull neck appearance) and hoarseness.
- Common complications are palatal palsy, III nerve palsy, polyneuritis and myocarditis.

Treatment

1. Supportive treatment as above in acute laryngitis.
2. Immediately refer the child to infectious diseases hospital under supervision and oxygen therapy. In case the child cannot be transferred, isolation should be done and following measures should be taken immediately:
3. Inj. Diphtheria antitoxin 20,000 - 40,000 IU, IV or IM for pharyngeal and laryngeal involvements with disease present for < 48 hours; 40,000 to 60,000 IU for nasopharyngeal infections; 80,000 to 100,000 IU for diffuse involvement that has been present for > 3 days.
4. Inj. Crystalline penicillin 1 Lac - 1.5 Lac units/kg/day divided into 4 doses for 14 days.

Or

Inj. Procaine penicillin 25,000 - 50,000 units/kg/day in 2 divided doses for 14 days.

Or

Syr. Erythromycin 40-50 mg/kg/day divided into 4 doses for 14 days.

5. IV saline infusion over 60 min.
6. Rifampicin, clindamycin can be used in patients allergic to penicillin.

References

1. Stridor. In: Scott Brown's Otolaryngology: 7th Edition, Volume 5, 2008; pp. 1114-1126.
2. Congenital Anomalies of the Larynx. In: Nelson's Textbook of Paediatrics. Behrman RE, Kleigman RM, Jenson HB (eds). 19th Edition, 2011; pp. 1450-1452.

SEPTICAEMIA

Septicaemia is associated with invasion of bloodstream by microorganisms producing systemic inflammatory response syndrome (SIRS) and multiorgan dysfunction.

Clinical Features

- A. **Systemic inflammatory response syndrome (SIRS):** The presence of at least two of the following four criteria, one of which must be abnormal temperature or leucocyte count:
 1. Temperature of $>38.5^{\circ}\text{C}$ or $<36^{\circ}\text{C}$
 2. Tachycardia / bradycardia.
 3. Tachypnoea
 4. Leucocyte count elevated or depressed for age or $>10\%$ immature neutrophils.
- B. **Infection:** Positive findings on clinical examination, imaging, or laboratory tests or a positive culture, tissue stain.
- C. **Severe sepsis:** Cardiovascular organ dysfunction, acute respiratory distress syndrome
- D. **Septic shock:** Hypotension [systolic BP $<70\text{mmHg}$ in infant; $<70 + 2 \times \text{age}$ after 1 year of age] or need for vasoactive drug [dopamine $>5\text{ mcg/kg/min}$ or dobutamine, epinephrine, or norepinephrine at any dose] or Signs of hypoperfusion.
- E. **Multiple organ dysfunction**

Treatment

Nonpharmacological

1. Care of airway and breathing as given in section on CPR.
2. Removal or drainage of a focal source of infection.
3. General care of skin, orodental hygiene and nutrition supplementation should be taken care of, in prolonged severe sepsis.

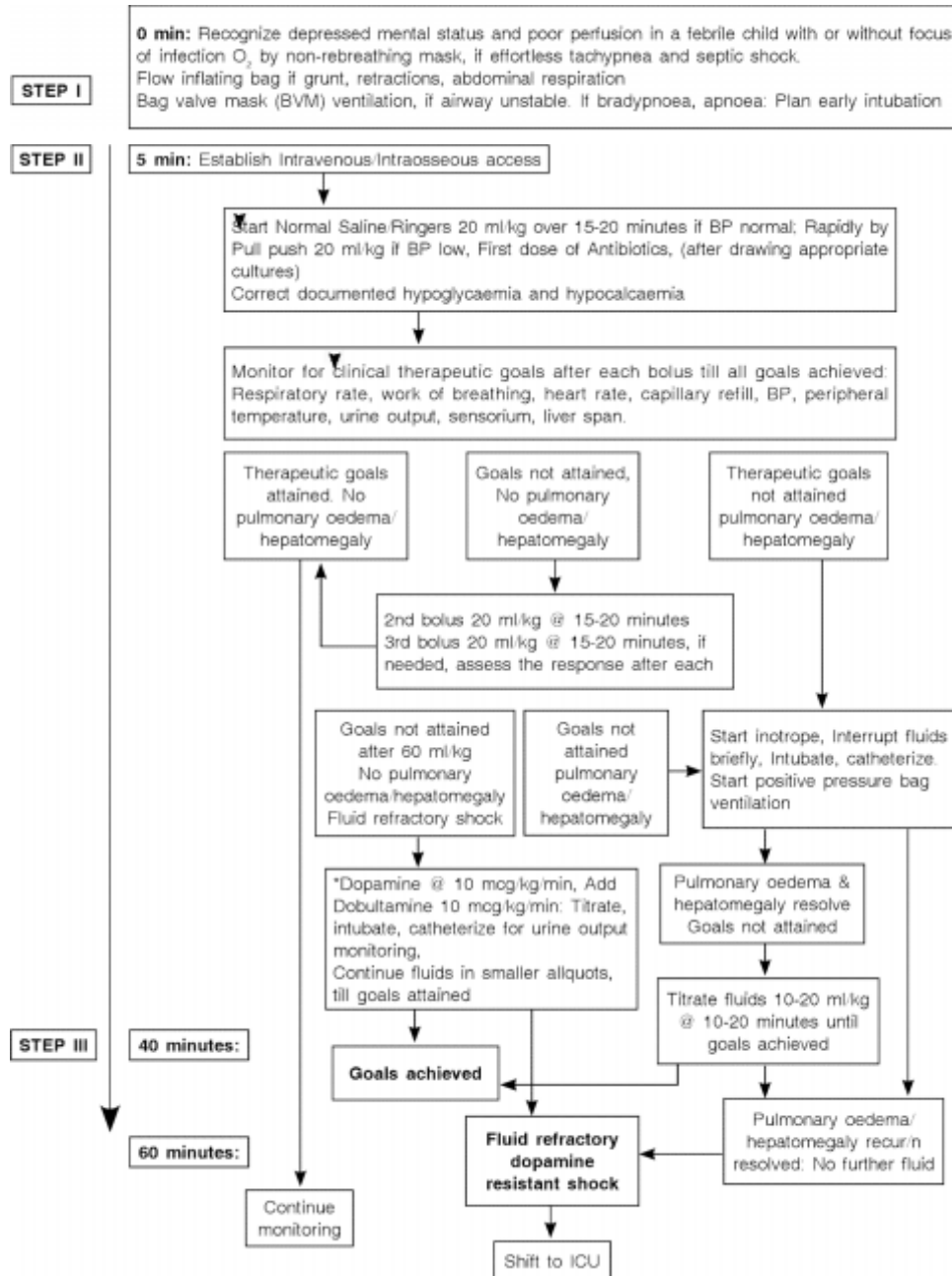
Pharmacological

1. Oxygen therapy—2-4 liters/min with catheter/mask (to keep $\text{SaO}_2 > 95\%$).
2. Intravenous fluids
3. Antimicrobial agents

Immunocompetent host

1. Inj. Cefotaxime 150-200 mg/kg/day in 3 divided doses.

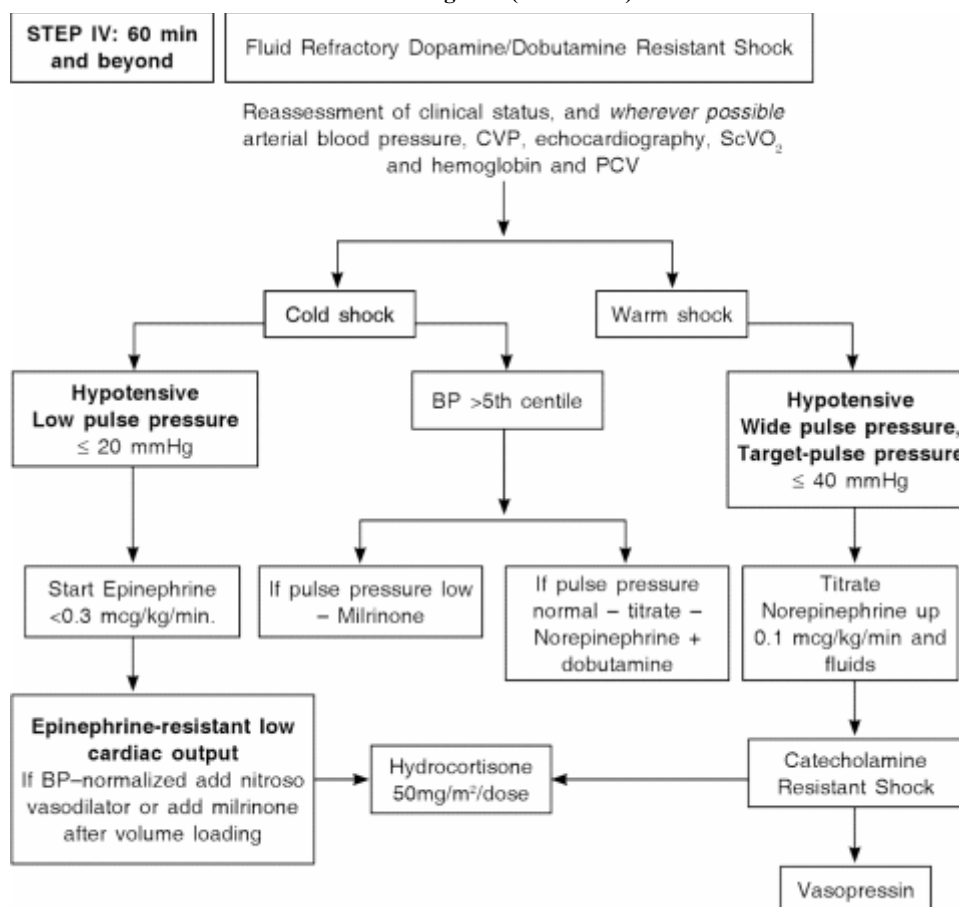
Fig. 2.8-Treatment algorithm for management of severe sepsis and shock in children



* Dopamine may be started after 2nd bolus

Plan epinephrine infusion early, if bradycardia, BP remains low or falls with cold shock at any step. Relief of tamponade, such as pneumothorax, or pericardial tamponade, increased intra-abdominal pressure due to fluid should be considered at any point.

Fig. 2.8. (Continued)



PCV: packed cell volume, CVP: central venous pressure, ScVO₂: Mixed venous O₂ saturation
Maximum dose of both Norepinephrine and Epinephrine is 1 mcg/kg/min

Fig. 2.8. Treatment algorithm for management of severe sepsis and shock in children.

Or

Inj. Ceftriaxone 100 mg/kg/day (maximum dose 4 g/day) in 2 divided doses.

2. Inj. Gentamicin 7.5 mg/kg/day in 2-3 divided doses.

Or

Inj. Amikacin 15 mg/kg/day in 2-3 divided doses.

3. Add Penicillin/Vancomycin, if *Streptococcus/Staphylococcus* organisms are suspected

Inj. Penicillin G aqueous 200,000-300,000 units/kg IV 4 hourly.

Or

Inj. Vancomycin 15 mg/kg/day in 2 divided doses.

Immunocompromised host

1. Inj. Ceftazidime IV 150 mg/kg/day in 3 divided doses.
2. Inj. Vancomycin 15 mg/kg/day in 2 divided doses.

References

1. Severe Sepsis and Septic Shock. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp. 2223-2232.
2. Shock. In: Nelson's Textbook of Paediatrics. Behrman RE, Kleigman RM, Jenson HB (eds), 19th Edition, WB Saunders, 2011; pp. 305-314.
3. Praveen Khilnani, Sunit Singhi, Rakesh Lodha, et al, Pediatric Sepsis Guidelines: Summary for resource-limited countries. Indian J Crit Care Med. 2010; 14: 41–52.
4. Facility Based IMNCI (F-IMNCI) Participants Manual. WHO, UNICEF, and Ministry of Health & Family Welfare, Government of India, 2009.

HEAD INJURY

Head injuries are frequent form of traumatic injuries.

Treatment

The management of head injured patients should be based on the Glasgow Coma Scale and Score (GCS) (see below in section on Coma).

Patients requiring hospitalization are –

- History of unconsciousness at any time since injury.
- Amnesia for the incident or subsequent events.
- Severe and persistent headache, nausea, vomiting.
- Bleeding from nose/ear.
- Seizures or presence of black eye.
- Suspected fracture of skull and haematoma of scalp .

Minor injury (GCS 13-15)- be kept under observation for a few hours and then sent home with proper instructions to the family members. Decision for X-ray skull and CT scan depends on degree of trauma to the rest of body and skull, in addition to the worsening of symptoms and signs.

Moderate head injury (GCS 9-12)-may be observed in the Emergency Department for a period of 4 hours with 30 minutely neurological observations (conscious state, PR, RR, BP, pupils and limb power). May be discharged, if there is improvement at 4 hours to normal conscious state and no further vomiting (patient should be able to tolerate oral fluids in the hospital) and with full written and verbal instructions to caregiver on when to report back immediately. If the patient is still drowsy or vomiting at 4 hours or there is any deterioration during this time, consult with a neurosurgeon regarding admission and further investigation.

Severe head injury (GCS 8 or less)-should be admitted to the hospital. A CT scan should be done in all such cases and treated as follows:

1. Check and maintain ABC and BP (see section on Cardiopulmonary Resuscitation).
2. Establish IV access.
5. IV fluids according to volume loss: Crystalloids such as normal saline (0.9%) is a fluid of choice.
6. Check for and stabilize extracranial injuries.
7. A head injury may be accompanied by a cervical injury. If spinal injuries are excluded, then transfer the patient in side position with head down, to a tertiary care centre where neurosurgical interventions are available.
8. If spinal injury is suspected then transfer the patient on a hard board, place two sand bags on either side of the head.
9. Assessment by Glasgow Coma Scale (as given in a section on Coma) Patients with score 8 or less or with deterioration of level of consciousness should be transferred to a centre where facilities for neurosurgical interventions are available.
10. A subdural, epidural or large intracerebral haematoma must immediately be attended to by a neurosurgeon.
11. Hyperthermia, hypoxia and hypercarbia exacerbate intracranial pressure, so does an awkward head position like acute flexion. These conditions must be appropriately treated, if necessary by mechanical ventilation.
12. In case of raised intracranial pressure, give Inj. Mannitol (20%) 0.25-1 g IV every 3 to 4 hours.

References

1. Concussion and Other Head Injury. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp. 3377-3382.
2. Early management of patients with a Head Injury. Scottish Intercollegiate Guidelines Network (SIGN) 2009.
3. Head Injury (G 56) National Institute for Health and Clinical Excellence (NHS) Nice Guideline 2007.
4. Guidelines for the management of severe traumatic head injury. J Neurotrauma 2007; 24 suppl 1; S1 - 96.

COMA

Coma is a prolonged period of unconsciousness and lack of reaction to stimulus. Patients in coma cannot be aroused.

Causes

- Structural damage to brain (haemorrhage, tumours, trauma, localized infections, meningitis, stroke).
- Metabolic disturbances (ischaemia, anoxia, uraemia, diabetes), respiratory/ hepatic/renal failure, dyselectrolytaemia, endocrinopathies, drugs like opiates, barbiturates, benzodiazepines, antidepressants and cyanide.
- Abnormal electrical activity—periodic lateralized epileptiform discharge (PLED).

Treatment

Nonpharmacological

- The immediate goal in acute coma is the prevention of further nervous system damage.
- Hypotension, hypoglycaemia, hypercalcaemia, hypoxia, hypercapnia, and hyperthermia should be corrected rapidly and assiduously.
- An oropharyngeal airway is adequate to keep the pharynx open in drowsy patients who are breathing normally.
- Tracheal intubation is indicated, if there is apnoea, upper airway obstruction, hypoventilation or emesis, or if the patient is liable to aspirate because of coma. Mechanical ventilation is required, if there is hypoventilation or if there is an intracranial mass and a need to induce hypocapnia in order to lower intracranial pressure.
- Establish intravenous access and draw blood sample for biochemical and other investigations.

Pharmacological

1. Inj. Glucose (25 or 50%) 50 g IV.
2. Inj. Thiamine 100 mg IV.
3. If opiate overdose is suspected, give Inj. Naloxone 0.8 mg IV. If response is inadequate, double the dose every 15 minutes (for details see section on Opioid Intoxication).
4. If benzodiazepine overdose is suspected, give Inj. Flumazenil 200 mcg IV slowly. If no response repeat 100-200 mcg after 1 minute. If required, give maximum dose of 1 mg or give as IV infusion of 100-400 mcg/h, if drowsiness recurs.
5. If focal neurological deficit or signs of herniation/decerebration/decompression occurs, CT scan, EEG and neurologic consultation are required.
6. If no clear aetiology and no herniation—CSF examination should be done.
7. If signs of raised intracranial tension (papilloedema, convulsions, decerebrate posture indicating herniation) occurs:
 - a. Avoid giving free fluid (glucose solution) intravenously.
 - b. Inj. Frusemide 40 mg IV to maintain adequate urine output of 30-50 ml/h.
 - c. Inj. Mannitol 1.0 g/kg IV over 10 minutes.
 - d. Hyperventilate to bring down PCO₂ to 25 mmHg.
 - e. Inj. Dexamethasone 20 mg IV stat and 6 mg 4 hourly.

Grading of coma

Table 2.6. Glasgow Coma Scale in adults

Eye opening (E)	Coma score
Spontaneous	4
To loud voice	3
To pain	2
Nil	1
Best motor response (M)	
Obeys command	6

Eye opening (E)	Coma score
Localizes pain	5
Withdraws (flexion)	4
Abnormal flexion posturing	3
Extension posturing	2
None	1
Verbal response (V)	
Oriented	5
Confused, disoriented	4
Inappropriate words	3
Incomprehensible sounds	2
None	1
Total Coma Score	3/15—15/15

Note: Coma score=E+M+V. Patients scoring 3 or 4 have an 85% chance of dying or remaining vegetative, while scores above 11 indicate only a 5 to 10% likelihood of death or vegetative state and 85% chance of moderate disability or good recovery. Intermediate scores correlate with proportional chances of recovery.

Table 2.7. Glasgow Coma Scale in children under 5 years of age

Feature	Scale Responses	Score Notation
Eye opening	Spontaneous	4
	To voice	3
	To pain	2
	None	1
Verbal response	Orientated/interacts/follows objects/smiles/alert/coos/	5
	Confused/consolable	4
	Inappropriate words/moaning	3
	None	1
Best motor response	Obey commands/normal movement	6
	Localise pain/withdraw to touch	5
	Withdraw to pain	4
	Flexion to pain	3
	Extension to pain	2
	None	1
TOTAL COMA 'SCORE'		3/15—15/15

References

1. Coma. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp 2247-2253.
2. Concussion and Other Head Injury. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp 3377-3382.
3. Early management of patients with a Head Injury. Scottish Intercollegiate Guidelines Network (SIGN) 2009.

POISONING

Stepwise care approach to a patient of poisoning is helpful in successful management.

Diagnosis

Table 2.8. Signs and symptoms helpful in diagnosis of poisoning

Signs	Poisons
1. CNS signs	
Delirium/ hallucinations	Antihistamines, datura, atropine and related drugs, psychomimetics, bromides, salicylates, pesticides.
Depression/ coma	Barbiturates and other sedatives, hypnotics, tranquilizer, morphine group, organic solvents, carbon monoxide, cyanides.
Convulsions	Organophosphates, organochlorines, phenol, amphetamine, atropine, kerosene, aminophylline, benzoyl benzoate, salicylates, strychnine.
Weakness or paralysis	Lead, arsenic, botulism, organic mercurials, triorthocresyl phosphate, pesticides.
Fasciculations	Organophosphates.
Dilated pupil	Atropine group, cocaine, nicotine.
Small pupil	Opium group, phenothiazines, organophosphates.
2. Respiratory signs	
Respiratory difficulty	Organophosphate-insecticides, salicylates, botulism, carbon monoxide, cyanides, atropine.
Cyanosis without respiratory distress	Methaemoglobinaemia.
3. Temperature abnormality	
High fever	Salicylates, anticholinergic, atropine, organophosphates, nitrophenols, kerosene, paracetamol.
Hypothermia	Opiates, barbiturates.

Signs	Poisons
4. CVS signs	
Hypotension	Beta-blockers, sedatives, hypnotics or narcotic.
Hypertension	Amphetamine or sympathomimetic overdose, sedative or narcotic withdrawal.
Bradycardia	Digitalis, beta-blockers, calcium channel antagonists or hypothermia.
5. Odours	Kerosene, bitter almond-cyanides, garlic-parathion, organophosphates, phosphorus, alcohol, paraldehyde, phenols and cresols, sulfides.

Treatment

A. *Basic principles and first aid measures*

- Attention to CAB of resuscitation .Removal of poison from the person
- Removal of contaminated clothing. In case of skin contamination - a shower or drenching the skin in a water tub and use of soap and water will mechanically remove the substance.
- For eye contamination, washing the eye with running clean water, holding the lids apart is a useful measure. Rubbing of eyes is to be discouraged. Use of sterile liquid paraffin will prevent irritation.
- When a toxic substance has been inhaled, removal of the person away to open surroundings, loosening of clothes and if necessary, artificial respiration are important first aid measures.
- In case of venomization by snake or insect bites (see section on Snake Bite), washing the area with clean water will mechanically remove the venom. **Suction (oral)of the bite area should be discouraged.** If the patient is unconscious, put the patientin a position lying on one side (preferably left side) with head tilted slightly backwards so that choking due to falling back of the tongue is prevented.

B. *Removal of ingested poison*

- With rare exceptions, gastric lavage, whole bowel irrigation, and administration of syrup of ipecac are no longer recommended.
- Administer single-dose activated charcoal within 1 hour of poisoning. Multiple-dose activated charcoal given in patients who have ingested a life-threatening amount of specific toxins (e.g., carbamazepine, dapsone, phenobarbital, quinine, or theophylline, tricyclic antidepressants, phenothiazines, alcohol, salicylates and many plant toxins). **Charcoal should not be administered for ingestions of caustic substances, metals, or hydrocarbons.** Charcoal should only be administered to patients with an intact or protected airway. In patients who are at risk for aspiration, endotracheal intubation and head-of-bed elevation should be performed before charcoal administration.
- Induce emesis

(**Caution:** Contraindicated in cases of corrosive poisoning, unconscious patients and in those who have swallowed petroleum products.)

Mechanical tickling of the throat with fingers, spatula or tongue depressor will induce vomiting.

Or

Two to four teaspoonful (10-20 ml) of syrup ipecac followed by half a glass of water.

(**Caution:** Contraindicated in children with age less than 6 months) Or

Inj. Apomorphine hydrochloride 6 mg subcutaneously causes vomiting in 3-4 minutes but should be used with caution since it is also a depressant.

Elimination through other measures. Elimination of poisonous substances can be enhanced by use of diuretics like frusemide, ethacrynic acid, acetazolamide, and osmotic substances like urea and mannitol. Forced alkaline diuresis treatment is done in patients of barbiturate intoxication. Other effective measures to eliminate ionizable substances are peritoneal dialysis, haemodialysis and exchange transfusions.

C. Antidotes

The absorption of the ingested poison can be reduced by activated charcoal, cholestyramine, Fuller's earth, bentonite, etc. Commonly available specific antidotes are shown in Table 2.9.

D. Asymptomatic therapy

Give symptomatic therapy for pain, vomiting, diarrhoea, abdominal distension, convulsions, hyperexcitability and delusions (for details see respective sections).

E. Supportive treatment

Fluid and electrolyte disturbances are managed with proper laboratory investigations and assessment of intake and output.

Table 2.9. Commonly available specific antidotes

Poison	Antidote and dose
Carbon monoxide	Pure oxygen
Cyanide	Sodium nitrite 3% soln, 0.2 ml/kg, IV over 2 min followed by sodium thiosulphate (25% soln, 1 ml/kg, IV over 10-20 minutes)
Nitrate and nitrites	If methaemoglobinaemia, treat with methylene blue
Organophosphates	Inj. Atropine - 0.05 mg/kg, IV every 10 min until signs of atropinism Inj. PAM 25-50 mg/kg, IV in older children, and 250 mg IV in infants over 10 kg Inj. Atropine - 0.05 mg/kg, IV every 10 min until signs of atropinism 5-10
Anticholinergics	Inj. Physostigmine 0.56 mg slow IV over 5 min (atropine gp); repeated every 10 min till a maximum of 2 mg.
Narcotics (opium)	Inj. Naloxone - 0.1 mg/kg, IV or intratracheal, from birth up to 5 years or 20 kg of weight, at time a minimum of 2 mg should be used
Methyl alcohol	Ethyl alcohol
Phenothiazine	Inj. Diphenhydramine 1-2 mg/kg
Iron	Inj. Desferrioxamine 15 mg/kg/h IV in 100-200 ml 5% glucose soln (maximum 80 mg/kg in 24 hours; 100 mg of desferrioxamine binds 8.5 mg of Iron).

Poison	Antidote and dose
Paracetamol	N-acetyl cysteine: Oral - initially 140 mg/kg, then 4 hourly up to 72 hours. IV 150 mg/kg by infusion over 125 min followed by 50 mg/kg 4 hourly for 72 hours.
Diazepam	Inj. Flumazenil in adults Initial dose: 0.2 mg IV one time over 30 seconds; 0.5 mg may be given every minute (most patients respond to 1 to 3 mg; Max total dose 3 mg). Patients responding partially at 3 mg may receive additional doses up to 5 mg. Resedation doses: 0.5 mg every 20 minutes to a total of 1 mg/dose and 3 mg/hour.
<i>Children 1 to 17 years:</i> Initial dose: 0.01 mg/kg IV over 15 seconds. Repeat doses: 0.01 mg/kg given over 15 seconds; may repeat 0.01 mg/kg after 45 seconds, then every minute to a maximum total cumulative dose of 0.05 mg/kg.	

4. Preventing recurrence of poisoning is by proper labelling, keeping such substances away from children; keeping medicines, cosmetics and household products separately, and psychiatric consultation to patients who have taken drugs with suicidal intention.

Table 2.10. Complications in poisoning and their management

Complications	Poisons	Management
Pulmonary oedema	CNS depressants	Semirecumbent position,
	Organophosphorus compounds	Diuretics
	Poisonous bites	Mannitol,
		Corticosteroids
Cardiac failure	Electrolyte disturbances	Cardiac glycosides
	Toxic myocarditis	
	Scorpion bites	
Cerebral oedema	Methyl alcohol	Diuretics
	Convulsions	Mannitol
		Dexamethasone
Acute renal failure	Nephrotoxic drugs	Management of shock
	Venoms	Alkaline urine
	Hypovolaemic shock	Fluid and electrolyte balance
	Haemolytic reactions	maintenance, dialysis
Acute hepatic failure	Poisonous substances	Management of liver failure
	Snake bites	

ORGANOPHOSPHORUS POISONING (OP)

Common agents for organophosphorus poisoning are malathion, parathion (fatal dose 0.1 mg/kg). Onset of symptoms is within 12 hours of exposure; usually following a household spraying.

Clinical Features

- Dizziness, headache.
- Blurred vision, miosis, excessive lacrimation
- Salivation, nausea, vomiting, diarrhoea, epigastric pain,
- Sense of constriction around chest, dyspnoea,
- Sweating, muscle twitching, fasciculations, flaccidity and muscle weakness
- Convulsions, , loss of reflexes and coma.

Diagnosis

Red cell cholinesterase level, which is reduced to 20% of the normal values in clinically apparent poisoning (normal range 5-12 U/ml).

Treatment

1. Establish airway, suctioning, and oxygen.
2. Establish an IV line, monitor BP, and do not rush fluids. If unable to protect airway—intubate and ventilate. **Do not use succinylcholine**, as it may result in prolonged paralysis of hours to days. Immediate aggressive use of atropine may eliminate the need for intubation.
3. Decontamination of the skin, mucous membrane and gut (if skin is contaminated, clean and wash using copious amount of soap water and change the clothing; gastric lavage and catharsis, if poison has been ingested).
4. Inj. Atropine IV 0.05 mg/kg every 10 minutes until signs of atropinism appear; maintain it for 24 hours. (The aim is to keep patient atropinised till poison effect weans off).
5. In moderate to severe cases, immediately give Inj. Pralidoxime (PAM) 25-50 mg/kg IV; in older children and in infants 250 mg IV over 5-10 minutes; and then 8 hourly up to 36 hours.
(**Caution:** Do not use in carbamate poisoning such as neostigmine, physostigmine, rivastigmine)
6. Administer paracetamol and non-opioid analgesia for relief of muscle pain.
7. Continuous monitoring is required for 72 hours or longer as organophosphate may

CXR.

Observe for deterioration post-reduction of drug therapies, auscultate lung bases for crackles. If crackles heard or there is a return of miosis, bradycardia or sweating, re-establish atropinization.

Note: Morphine, succinylcholine, theophylline, phenothiazines, reserpine are contraindicated.

ALUMINIUM PHOSPHIDE AND PHOSPHINE POISONING

Aluminium phosphide toxicity can occur either after the inhalation of phosphine gas or after the ingestion of aluminium phosphide pellets. The specified fatal dose is 0.15-0.5 g.

Clinical Features

- Mild exposure-dizziness, easy fatigability, nausea, vomiting, headache and diarrhoea
- Moderate to severe poisoning-Excessive thirst, abdominal pain and epigastric tenderness, ataxia, numbness, paraesthesia, muscle weakness, paralysis, diplopia and jaundice. In severe inhalational poisoning- acute respiratory distress syndrome (ARDS), congestive cardiac failure, convulsion and coma.
- Cardiovascular - profound hypotension, dry pericarditis, myocarditis, acute congestive heart failure and arrhythmias. Several ECG changes ranging from ST segment elevation/depression, PR and QRS interval prolongation, complete heart block to ectopics and fibrillation. Highly variable arrhythmias in a young patient with shock and no previous history of cardiac disease points towards aluminium phosphide poisoning.

Diagnosis

- Typical clinical features,
- Garlicky odour from the mouth
- Confirmation by silver nitrate test on patient's breath or blood or gastric acid.

Treatment

There is no specific antidote and treatment is mainly supportive.

1. Oxygen inhalation and if required, by intubation and assisted ventilation.
2. Intravenous fluids to maintain adequate hydration 2-3 litres of normal saline to be administered within the first 8-12 h guided by central venous pressure (CVP) and pulmonary capillary wedge pressure (PCWP). The aim is to keep the CVP at around 12-14 cm of water.
3. For treatment of shock, low dose Inj. Dopamine 4-6 mcg/kg/min to maintain systolic BP >90 mm Hg and Inj. Hydrocortisone 200-400 mg IV every 4-6 h. For details of management of shock, see section on Shock in Chapter 2.
4. Diuretics like frusemide can be given, if systolic blood pressure is >90 mm Hg to enhance excretion.
5. An early gastric lavage with potassium permanganate (1:10,000) or saline or sodium bicarbonate within the first 30-45 minutes followed by slurry of activated charcoal (approx 100 g) through a nasogastric tube.
6. If Bicarbonate level less than 15 mEq/L, give Inj. Soda bicarbonate in a dose of 50-100 mEq IV every 8 hour till the bicarbonate level rises to 18-20 mEq/L. Patients may require up to 300-500 ml of sodium bicarbonate. Dialysis may be required for severe acidosis and acute renal failure.
7. For treatment of cardiac arrhythmias, intensive cardiac monitoring is necessary in ICU (For details see Chapter 2). Magnesium sulphate is effective in both tachy- and bradyarrhythmias due to its membrane stabilizing effect.

PHENOL

Phenol or carbolic acid is a household disinfectant. Poisoning usually occurs due to ingestion mainly. The minimum lethal oral dose is 1 g or 20 ml .

Clinical Features

Systemic effects - convulsions, sudden collapse, coma, nausea, vomiting, diarrhoea, methemoglobinaemia, haemolytic anaemia, profuse sweating, hypotension, arrhythmia, pulmonary oedema, seizures, acidosis and shock.

Diagnosis

- Clinical features
- Urine analysis - red blood cells, proteins and casts. Add a few drops of 10% ferric chloride in urine. A violet or blue colour indicates the presence of phenolic compounds.

Treatment

There is no antidote for phenol. Treatment consists of support of respiratory and cardiovascular functions.

1. Maintain airway, breathing and circulation and establish vascular access.
2. Inhalation of 100% oxygen. Intubation and assisted ventilation might be necessary. Extreme throat swelling may require endotracheal intubation or cricothyroidotomy.
3. Rapid decontamination of the skin with extensive irrigation. Flush exposed or irritated eyes with copious amounts of water or saline for at least 15 minutes. Health personnel should wear protective clothing and gloves while treating patients whose skin/cloths are contaminated with phenol. Remove contaminated clothing rapidly.
(**Caution:** Avoid hypothermia when decontaminating children or the elderly. Use blankets or warmers when appropriate).
4. If phenol is ingested, victims who are conscious and able to swallow should be given 4 to 8 ounces of milk, egg whites, or gelatin solution, if this has not been given previously; if the patient is symptomatic, delay decontamination until other emergency measures have been instituted. **Do not induce emesis.**
5. If the victim is alert, asymptomatic, and has a gag reflex, administer a slurry of activated charcoal at 1 g/kg (usual adult dose 60-90 g, child dose 25-50 g). A soda can and straw may be of assistance when offering charcoal to a child.
6. Consider gastric lavage with a small nasogastric tube with a sodium or magnesium sulphate solution for the lavage, if a large dose has been ingested; the patient's condition is evaluated within 30 minutes; the patient has oral lesions or persistent oesophageal discomfort.
(**Caution:** Blind gastric-tube placement may further injure the chemically damaged oesophagus or stomach; lavage is discouraged in children unless performed under endoscopic guidance).
Isolate toxic vomitus or gastric washings (collect vomitus in plastic bags, attach the lavage tube to isolated wall suction or another closed container).
7. Treat shock (fluids and dopamine), arrhythmias (lidocaine) and convulsions (diazepam). For details see respective sections.
8. In children who develop stridor, Epinephrine aerosol 0.25-0.75 ml of 2.25% racemic epinephrine solution in 2.5 cc water, repeat every 20 minutes as needed, cautioning for myocardial variability.

9. Treat patients who have bronchospasm with aerosolized bronchodilators.
10. Metabolic acidosis should be managed by 1 to 2 mEq/kg of sodium bicarbonate.
11. Methemoglobinaemia should be treated, if greater than 30%, or in cases of respiratory distress, with Inj. Methylene blue 1 to 2 mg/kg of 1% solution, slowly IV. Further doses may be required.

Pulmonary oedema or CNS effects may be delayed, patients who have suspected serious exposure should be observed and re-examined periodically for 18 to 24 hours.

To detect an oesophageal stricture, follow up the patient. Patients who have mild exposure and remain asymptomatic for 2 to 4 hours may be discharged with instructions to seek medical care promptly, if symptoms develop. Patients who have skin or eye burns should be re-examined in 24 hours.

HYDROCARBONS (KEROSENE, PETROL)

Most common accidental poisoning in children. Toxicity arise from the inhalation of vapours or pulmonary aspiration of the liquid while being ingested. Large amounts (100 ml or more) must be swallowed to allow GI absorption to produce pulmonary lesion.

- Respiratory symptoms -cough, breathlessness, tachypnoea ,hyperexpansion of chest ,haemoptysis ,cyanosis
- CNS involvement - lethargy, dizziness, headache, visual disturbances ,seizures, hyperpyrexia, coma, respiratory paralysis and death.
- Ingestion: nausea, vomiting and occasionally diarrhoea.
- Ocular: immediate stinging and burning sensation with lacrimation.
- Dermal: Drying and cracking, transient pain with erythema, blistering and superficial burns.

Diagnosis

- Clinical features
- Radiographic findings - perihilar mottling, consolidation, areas of collapse or frank pulmonary oedema. Pleural effusion may develop. Rarely cysts or pneumatocoeles may form.

Treatment

- Remove patient from exposure. In case of inhalation, give oxygen; maintain a clear airway and adequate ventilation and apply other measures as indicated by the patient's clinical condition.
 - In case of dermal exposure, remove all soiled clothing and wash the contaminated area thoroughly with soap and water for 15 minutes.
 - In case of ocular exposure, remove contact lenses and immediately irrigate the affected eye thoroughly with water or 0.9% saline for at least 10-15 minute.
- If significant symptoms - chest X-ray to identify pulmonary disease. Liver and renal function tests, urine and electrolytes should be evaluated.
- Prevention of aspiration is the main goal. **Do not induce emesis.**

- Gastric lavage should not be undertaken. Consider gastric aspiration within 1 hour of ingestion, if very large amounts have been taken or there is concern about another toxin, provided the airway can be protected.
- Specific treatment is aimed at aggressive correction of hypoxia with humidified oxygen and CPAP (continuous positive airway pressure).
- Prophylactic antibiotics to prevent secondary bacterial infection may be used.

CARBON MONOXIDE

Carbon monoxide (CO) exposure occurs by smoke inhalation, heating systems in rooms that are not properly ventilated and petrol engine exhaust fumes.

Low-level poisoning

Early features: - nausea, subjective weakness, headache and poor concentration/memory.

Late features: - disorientation, apathy, irritability, inability to concentrate, personality change, parkinsonism, parietal lobe lesions and memory loss. encephalopathy, urinary and/or faecal incontinence and disturbance of gait.

Chronic poisoning - headache, nausea and flu-like symptoms, vertigo, alteration in consciousness and subjective feeling of weakness.

High-level poisoning

The above symptoms may be more severe. In addition: personality change, poor performance on the mini-mental state examination, tachycardia and tachypnoea, dizziness and ataxia, angina, hypotension, arrhythmias, agitation, seizures, impairment of consciousness and respiratory failure; cerebral oedema and metabolic acidosis may develop.

Investigations findings

- ECG changes,
- Serum electrolytes - metabolic acidosis
- Raised TLC and amylase
- Raised SGOT and SGPT
- Raised carboxyhaemoglobin level
- CT scan -symmetrical and diffuse low density lesions in globus pallidus, cortical lesions.

Treatment

Prehospital

Remove the patient promptly from the source of exposure and immediately institute oxygen therapy with a non-rebreather mask.

Hospital

1. Perform intubation for the comatose patient or, if necessary, for airway protection, and provide 100% oxygen therapy and may be required for 24 hours.
2. Institute cardiac monitoring. Difference between the saturation as measured by pulse oximetry and one measured directly, is equal to the HbCO level. In uncomplicated

intoxications, venous HbCO levels and oxygen therapy are likely to be sufficient.

5. Evaluate patients with significant cardiovascular disease and initial HbCO levels above 15% for myocardial ischaemia and infarction and treat accordingly (for details see Chapter 4).
6. Consider immediate transfer of patients with levels above 40% or cardiovascular or neurologic impairment to a hyperbaric facility, if feasible. Persistent impairment after 4 hours of normobaric oxygen therapy necessitates transfer to a hyperbaric centre.
7. Calculate a gross estimate of the necessary duration of therapy using the initial level and half-life of 30-90 minutes at 100% oxygen.
8. Pregnant patients with lower HbCO (above 15%) should be considered for hyperbaric treatment. Continue treatment even after carbon monoxide is no longer found in the blood.
9. Inj. Mannitol 1g/kg intravenously over 20 minutes, if cerebral oedema is suspected.

Asymptomatic patients with HbCO levels below 10% may be discharged. Admit patients with histories of lung or vascular diseases, young children and pregnant women without symptoms for observation in a monitored setting (CCU/ICU) and evaluate acid-base status. Refer patients with cerebral oedema to a neurosurgical ICU setting.

ETHYLENE GLYCOL AND METHANOL

Methanol is commonly found in home chemicals, industrial chemicals, varnishes, paints, dyes and used as denaturant in ethanol. Toxic dose is 15-30 ml of 40% methanol. Symptoms of toxicity appear within 12-24 hours.

Clinical Features

- Initially -nausea, vomiting, abdominal pain and mild CNS depression.
- After 12-24 hours - metabolic acidosis, visual disturbance (difficulty in vision, pupillary dilation, retinal oedema and optic disc hyperaemia) due to formation of formic acid.
- At later stages- seizures, coma and respiratory failure may develop.

Treatment

1. Maintain airway, breathing, and circulation (See section on CPR in Chapter 2).
2. Gastric lavage, if patient reports within four hours of consumption.
3. Sodium bicarbonate intravenously liberally, if pH <7.35 or bicarbonate <15 mEq/l.
4. If methanol level >20 mg/dl, osmolar gap >10 mosm/L H₂O ethylene glycol Inj. Fomepizole loading dose 15 mg/kg IV as soon as possible, subsequent dose 10 mg/kg every 12 h for 48 h. After 48 h 15 mg/kg 12 hourly (higher maintenance dose due to autoinduction) until serum level of methanol is < 20 mg/dl and there is resolution of metabolic acidosis and symptoms.

Or

Ethanol is given as oral loading dose as 56 ml of 100% ethanol or 140 ml of 40% ethanol for a 60 kg patient. Maintenance dose is 10 ml/h for 100% ethanol or 50 ml/h of 20% ethanol and given as IV infusion of 100-130 mg/kg/h. Close monitoring of serum ethanol concentrations is essential in order to achieve a value within the recommended range.

(**Caution:** Adverse effects include hypoglycaemia, due to inebriation CNS depression, pancreatitis, and local phlebitis. Check serum glucose levels frequently, at least every 2 hours and maintain sugar levels between 100-150 mg/dl).

5. Haemodialysis in severe ethylene glycol and methanol poisoning, if serum methanol levels >50 mg/dl, metabolic acidosis, significant electrolyte disturbance unresponsive to conventional treatment, CNS, visual or funduscopy abnormalities, renal failure and in case of consumption of >30 ml of methanol. During dialysis, Fomepizole needs to be dosed every four rather than every 12 hours.
6. Inj. Folinic acid should be administered at a dose of 1 mg/kg, with a maximal dose of 50 mg. It should be repeated every 4 hours. If Folinic acid is not immediately available, folic acid can be substituted at the same dose.
7. If ethylene glycol overdose is suspected and in patients with methanol poisoning who are also ethanol abusers, give Inj. Thiamine 100 mg IV every 6 hours and 50 mg of Pyridoxine every 6 hours.

DHATURA POISONING

Datura stramonium (thorn apple) seeds and fruits are the most poisonous parts of the plant with hyoscyne, hyoscyamine and traces of atropine, as the active principles.

Clinical Features

- GIT - gastric irritation, bitter taste, dry mouth and throat, burning pain in the stomach and difficulty in swallowing and talking.
- Followed by giddiness, ataxia, incoordination of muscles, a peculiar flushed appearance of the face, dry hot skin, rise in temperature, diplopia, dilated pupils with loss of accommodation, reddening of the conjunctiva and drowsiness, an erythematous rash.
- Full, bounding pulse which later becomes weak and irregular.
- Muttering delirium, person tries to run away from the bed, picks at bed clothes, tries to pull imaginary threads from the tips of his fingers and develops dreadful hallucinations of sight and hearing.
- Stupor, convulsions, coma and sometimes death from respiratory failure. Death may occur within 4-24 hours.

Treatment

1. The stomach is washed out with 1:10,000 potassium permanganate solution or 5% tannic acid solution.
2. In severe poisoning, only Inj. Physostigmine 1-2 mg IM or IV repeated after half an hour, if necessary. Watch for side effects: bradycardia, heart block, excessive secretions.
3. Inj. Pilocarpine nitrate 6-15 mg injected subcutaneously.
4. Inj. Diazepam may be given for convulsions (see section on Status Epilepticus).
5. For delirium, chloral hydrate, Inj. Paraldehyde or any short-acting barbiturate is usually given.

(**Caution:** Morphine is contraindicated).

OPIOID INTOXICATION

Opioid overdose is usually accidental. It can result from incorrect estimation of dose or erratic pattern of use in which person has lost previous tolerance to drug. Often caused by combined use with other CNS depressants, e.g. alcohol or sedative hypnotics.

Clinical Features

- Pinpoint pupils
- Respiratory depression and CNS depression
- Decreased gastrointestinal motility, analgesia, nausea and vomiting
- Slurred speech
- Hypotension, bradycardia and seizures.

Treatment [immediate admission in intensive care unit (ICU)]

1. Establish adequate airway and respiration. Oxygen inhalation and IV fluids. If facilities are available, give artificial ventilation.
2. Activated charcoal 1g/kg suspended in water, if ingestion of large doses of oral opioids is suspected.

Or

Gastric lavage to remove any remaining drug.

3. Inj. Naloxone 0.4-2 mg IV or IM (0.01 mg/kg for neonates) and response should occur in 1-2 min, if needed dose can be repeated every 2-3 min up to 10 mg. If no response to 10 mg, it is unlikely due to opioids except in case of buprenorphine or suspect another diagnosis. Titrate dose relative to the patient's symptoms to ameliorate the respiratory depression but not provoke a severe withdrawal state. If successful, continue at 0.4 mg every hour IV until the opioid has been cleared (at least for 24 hours for heroin and 72 hours for methadone overdose). Babies born to opioid-abusing mothers may experience intoxication, overdose or withdrawal.
4. Always consider possible polysubstance overdose. A patient successfully treated with naloxone may wake up briefly only to succumb to a subsequent overdose from another slower acting drugs, e.g. sedative-hypnotic taken simultaneously. Give Inj. Flumazenil 0.2 mg/min (max 3 mg in an hour) (**Caution:** It might precipitate seizures and increase intracranial pressure).
5. Supportive measures for respiration, hypotension with pressor agents and cardiac arrhythmia.
6. Body warmth to be maintained with hot water bottles.
7. If convulsions are present, Inj. Diazepam 10 mg IV and repeated as required (for details see section on Status Epilepticus).
8. ***The patient should not be made to walk forcibly in opium poisoning***, as it is frequently done, but attempts should be made to keep him awake, by flicking a wet towel on the face.

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TRAUMA

Cardiac arrest associated with trauma

Consider if there are reversible causes of cardiac arrest and treat which include hypoxia, hypovolaemia, diminished cardiac output secondary to pneumothorax or pericardial tamponade, and hypothermia.

BLS modifications

- When multisystem trauma / trauma involves the head and neck, the cervical spine must be stabilized. A jaw thrust should be used instead of a head tilt–chin lift to establish a patent airway.
- If breathing is inadequate and the patient's face is bloody, ventilation should be provided with a barrier device, a pocket mask, or a bag-mask device while maintaining cervical spine stabilization.
- Stop any visible haemorrhage using direct compression and appropriate dressings.

ACLS modifications

- After initiation of BLS care, if bag-mask ventilation is inadequate, an advanced airway /cricothyrotomy should be considered.
- When the airway, oxygenation, and ventilation are adequate, evaluate and support circulation.
- Control ongoing bleeding where possible and replace lost volume.
- Ventricular fibrillation (VF) and pulseless ventricular tachycardia (VT) are treated with CPR and defibrillation.
- In cardiac tamponade in traumatic cardiac arrest, consider emergency department thoracotomy.

Commotio cordis

Rapid defibrillation is often life-saving for these frequently young victims of cardiac arrest. Provide immediate BLS care using an automated external defibrillator (AED) and ACLS for VF.

THORACIC TRAUMA

Most thoracic traumas do not require thoracotomy but rather simple life-saving manoeuvres of airway control, rapid infusion of fluids and tube thoracostomy are needed. The trauma can be penetrating or blunt.

Blunt trauma causes injury to the chest by the following mechanisms:

1. Direct blow, e.g. rib fracture.
2. Deceleration injury, e.g. pulmonary contusion.
3. Compression injury, e.g. cardiac and diaphragm injury.

Clinical features

Chest pain and shortness of breath. Careful physical examination of the patient is important especially in the management of patient with equivocal radiological investigation.

Management

(a) **Resuscitation.** Assess for the patency of airway, breathing and circulation. Insert two 16G intravenous cannulae and start resuscitation with crystalloid. If haemothorax or a pneumothorax are suspected in a patient with acute respiratory distress, chest tube should be inserted through the 4th/5th intercostal space in the anterior axillary line on the affected side without waiting for chest radiography.

(b) **Quick assessment of injuries.**

Treatment of specific injury

1. Chest wall

- (a) **Rib fracture**-pain with inspiration and localized tenderness and occasional localized crepitus on examination are present. Diagnosis is confirmed with a chest X-ray anteroposterior view. Exclude other intrathoracic injuries. Patients are treated with adequate analgesic drugs and muscle relaxants. In cases of multiple fractures, intercostal nerve blocks or epidural analgesia is required to ensure adequate pain relief and ventilation. Elderly patients need admission for pain relief, ventilation assistance and observation.
- (b) **Flail chest** occurs -hypoventilation, atelectasis, hypercapnoea and inadequate ventilation ($RR > 40/\text{min}$, $pO_2 < 60 \text{ mmHg}$ with 60% FiO_2). It requires immediate endotracheal intubation and ventilatory support.

2. Pleural space

- (a) **Haemothorax**- In 85% of the patients with haemothorax, only tube thoracostomy is required. After tube thoracostomy, if the rate of continuing haemorrhage is more than 100-200 ml/hour or the haemorrhagic output exceeds 1000 ml in 24 hours, thoracotomy should be performed.
- (b) **Pneumothorax**- require immediate diagnosis and chest tube insertion without waiting for a

chest X-ray examination. Subcutaneous emphysema, absent breath sound, mediastinal shift and acute respiratory distress are found. Sucking chest wounds, which allow air to pass in and out of the pleural cavity, should promptly be treated by closure of the wound (initially sealing with large pads and later with suturing) and concomitant tube thoracostomy. Simple pneumothorax (without tension) should also be managed by chest tube insertion but only after documentation by chest X-ray.

3. Lung injury

- (a) Pulmonary parenchymal injury - about 15% of penetrating lung injury requires thoracotomy for control of haemorrhage. Approximately 80-90% of pulmonary injuries requiring operation can be managed by simple suturing or stapling of the involved segments. Only 10-20% cases require anatomical lung resection.
- (b) Pulmonary contusion in most patients with flail chest can also appear without any evidence of rib fracture (particularly in children). Treatment is often delayed because clinical and X-ray findings may not appear until 12-24 hours after injury.

Clinical findings are loose, copious, blood tinged secretions, chest pain, restlessness, and laboured respiration. X-ray changes consist of patchy parenchymal opacification or diffuse peribronchial densities.

Management involves careful pulmonary support and clearing of secretions, with ventilatory support, if arterial blood gases cannot be maintained in a physiologic range. Positive end-expiratory pressure (PEEP) is a useful adjunct in the management of those requiring ventilation. Fluid overload should be avoided.

4. Trachea and bronchus

Tracheobronchial injuries - massive air leak or when the lung does not readily expand after chest tube placement is seen. Diagnosis may require tracheobronchoscopy. When diagnosis is confirmed, thoracotomy and primary repair is advised.

5. Heart and pericardium

Cardiac tamponade in blunt trauma is often due to myocardial rupture or coronary artery laceration. Patient presents with chest pain, distended neck veins, shock and cyanosis. Treatment includes immediate thoracotomy, pericardial decompression and repair of injuries.

6. Oesophagus

Oesophageal perforation presents as pain; fever develops within hours in most patients. Regurgitation of food, hoarseness, dysphagia or respiratory distress may be present. Physical findings include shock, local tenderness, subcutaneous emphysema, or Hamman's sign. X-ray findings on plain chest films include evidence of foreign body or missile and mediastinal widening or air. Contrast studies (urograffin, not barium) confirm the diagnosis. Treatment consists of early recognition (24-48 h), closure of oesophageal perforation and pleural drainage. Old perforation may require advanced surgical management and should be referred to a specialized centre.

Reference

1. Thoracic Injury and Sepsis. In: Hamilton Bailey's Emergency Surgery. Ellis BW, Paterson-Brown S. Arnold (eds), 13th Edition, London, 2000; pp 285-288.

BLUNT ABDOMINAL TRAUMA

The presentation varies from innocuous injury with no symptoms or signs of a severe injury

presenting with peritonitis or shock or even causing death before reaching the hospital. The management depends upon the condition at presentation:

1. Immediately transfer the patient to the hospital along with intensive monitoring, where facilities for operation are available after providing first-aid treatment for bleeding and shock. Evaluate for head injury and intrathoracic injuries.
2. Immediate exploratory laparotomy should be done, if the patient is in shock, has rigid distended abdomen, evidence of peritonitis or evisceration of the bowel.

(a) Diagnostic peritoneal lavage (DPL). Done in patients with trauma who are hypotensive with possible intra-abdominal bleeding and in patients with unreliable physical examination due to altered sensorium (injury to brain, ingestion of alcohol or drugs), loss of sensation (injury to spinal cord) or injuries to adjacent structures (pelvis, ribs, dorsolumbar spine):

- Insert nasogastric tube and urinary catheter.
- Use an infraumbilical incision (supraumbilical, if patient has pelvic fracture).
- Lavage is considered positive, if you get 10-20 ml non-clotting blood or bile, succus entericus, stool or food material.

In a hypotensive patient with grossly negative 'tap' (i.e. no fresh blood aspirated), the value of time-consuming lavage with 1000 ml of saline and its evaluation by microscopy (often not available) is questionable.

(b) Contrast-enhanced computed tomography (CECT) of abdomen should be performed in patients who are haemodynamically stable and in whom physical examination is unreliable because of the above mentioned factors.

Patients with lesser grades of liver or splenic injuries can be managed conservatively, provided intensive monitoring facilities and facility for immediate exploration, should the need arise, are there.

When CT scan is not available, chest X-ray in erect posture, plain X-ray films of abdomen and contrast studies of the bowel or urinary tract as and when indicated will detect all the injuries except injuries to liver, spleen and pancreas. Ultrasound examination can help to detect solid organ injuries, collections in the peripheral cavity.

References

1. Maingot's Abdominal Operations. Zinner MJ, Schwartz SI, Ellis H. (eds), 10th Edition, Prentice Hall International, 1987; pp. 763-786.
2. Abdominal trauma. In: Hamilton Bailey's Emergency Surgery. Ellis BW, Paterson-Brown S. Arnold (eds), 13th Edition, London, 2000.
3. Jill S Whitehouse and John A Weigelt. Diagnostic Peritoneal Lavage: A Review of Indications, Technique, and Interpretation. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine 2009, 17:13 doi:10.1186/1757-7241-17-13. <http://www.sjtreem.com/content/17/1/13>.

PENETRATING STAB INJURIES

The management depends upon the site of injury.

I. Anterior abdominal wall (between two axillary lines)

- A. Immediate exploratory laparotomy, if patient is in shock at the time of presentation with rigid distended abdomen, peritonitis or evisceration.

- B. Wound exploration in operation theatre with good illumination in haemodynamically stable and cooperative patients. If anterior fascia (in obese patients) or peritoneum (in thin patients) is not breached, wound can be closed after irrigation and patient can be discharged and followed up in the OPD.
- C. If wound exploration reveals breach of anterior fascia or peritoneum but the abdomen does not have evidence of peritonitis, the patient can be admitted and serially examined for 24 hours. The other option is to perform diagnostic peritoneal lavage (DPL).

II. *Stab wound of the flank*(between anterior and posterior axillary lines from sixth intercostal space to iliac crest) and back (posterior to posterior axillary line between tip of scapula and iliac crest).

In haemodynamically stable and cooperative patients-Wound exploration in operation theatre with good illumination. If anterior fascia (in obese patients) or peritoneum (in thin patients) is not breached, wound can be closed after irrigation and patient can be discharged. In patient where the end of the wound track cannot be reached (because of thick musculature in that area), patient should be admitted and serially examined for 24-48 h. If any sign(s) of intra-abdominal injury are obvious, laparotomy should be performed. Or perform triple contrast CECT (intravenous, oral and rectal), and proceed according to the findings.

III. *Gunshot wounds of the abdomen*

Exploratory laparotomy . However, if patient presents late and is haemodynamically stable and have no signs of peritonitis, the patient can be serially examined or subjected to triple contrast CECT before deciding for conservative treatment.

References

1. Abdominal Trauma and Indications for Celiotomy. In: Trauma. Moore EE, Mattox KL, Feliciano DV, Appleton and Lange (eds), 2nd Edition, 1991; pp. 409-426.
2. Blunt and Penetrating Abdominal Trauma. In: Maingot's Abdominal Operations, 10th Edition. Prentice Hall International, 1987; pp 763-786.

CHEMICAL BURNS OR INJURIES OF THE EYE

Chemical injuries due to entry of alkaline or acidic materials may result in potentially serious ocular damage including permanent visual loss and cosmetically unsightly eye.

Clinical Features

- Congestion and chemosis of conjunctiva, corneal epithelial damage, total loss of corneal epithelium, corneal haziness or totally opaque cornea, limbal ischaemia, anterior uveitis, cataract and rise in intraocular pressure (IOP), lid injury, symblepharon.
- Complications - non-healing epithelial and stromal ulceration, corneal perforation, corneal melting, sequelae vascularized opaque cornea, cataract, glaucoma, symblepharon, dry eye, eyelid deformities, phthisis bulbi.

Treatment (at the site of injury)

Irrigate the eye (conjunctival sac) with any innocuous liquid water and continue for at least 10 min. The face may be plunged into a water container and then open the eyes under water.

Treatment in the hospital

1. Irrigation in the hospital—retract the eyelids and irrigate the conjunctival sac with normal saline or Ringer's lactate or water using intravenous tubing connected to the irrigating solution for 30 minutes or until litmus paper touched to the inferior fornix indicates neutrality.
(**Caution:** Do not try to neutralize the alkali with acids or vice versa)
2. Remove retained solid particles of lime, or any other material from superior and inferior fornix after anaesthetizing the conjunctiva. It may require double eversion of eyelid and use of forceps. If double eversion is not possible, a moistened cotton-tipped applicator should be swept in the fornix.

Sodium ethylene diamine tetra-acetic acid (EDTA) 0.01 to 0.05 molar solution may be used as an irritant to dissolve calcium hydroxide.

Pharmacological (acute phase 1st week)

1. Homatropine eyedrops 2% 3 times a day.
2. Gentamicin eyedrops 0.4% 4 times a day. **Or**
Ciprofloxacin eyedrops 0.3% 4 times a day.
Tab. Ibuprofen 400 mg, if required.
Patch the eye and refer to an ophthalmologist.

Surgical therapy

Debridement, tenoplasty, limbal stem cell transplantation, keratoplasty, keratopresthesis, etc.

Reference

1. Manual of Ocular Diagnosis and Therapy, 4th Edition, Little Bran and Company, 1996; pp. 32-33.

FOREIGN BODY IN THE EYE

This could be a small insect or a piece of grit or a loose eyelash.

Clinical Features

Acute pain, redness and watering in the affected eye.

Treatment (at the site of injury)

Nonpharmacological

- Not to rub the affected eye. If possible, make the patient blink the eyelids, with the eye under clean water.
- If this is not effective, make the patient sit in good light, wash your hands with soap and water and try to remove the foreign body gently by flushing the eye with clean water or saline.
- Foreign body under the upper eyelid- turn the eyelid up and identify the foreign body and then remove it gently with moistened and twisted cotton wool or a clean piece of cloth.
- Foreign body in the lower lid- gently draw the lower lid down and identify the particle and remove it with a moistened wisp of cotton.

Pharmacological

After removal, ciprofloxacin eye ointment/eyedrop should be applied and the eye should be bandaged. In case the foreign body cannot be removed or corneal perforation occur immediately refer to a higher centre.

BLACK EYE

Black eye is a collection of blood and fluid in the space around the eye, under the skin due to injury/blow to face or head or as a result of surgical procedure on face and head injury.

Clinical features

- Subconjunctival haemorrhage
- Injury to nose or basilar skull fracture - bilateral black eyes.
- Double vision, loss of vision, loss of consciousness, inability to move the eye, blood on surface of eye itself, lacerations or cuts on the eyelids, or injury with penetrating object.

Investigations

- Visual acuity,
- Pupil and outer examination,
- Ocular movements,
- Fluorescence staining,
- X-ray orbits, orbital bones and CT scan orbit for suspected fracture or foreign body.

Treatment***Nonpharmacological***

- Apply cold pack or ice wrapped in cloth (Do NOT apply direct ice) to constrict blood vessels and localize bleeding. Do not press on eye while applying cold pack.
- Sleep with head elevated on 2 pillows to decrease swelling of eyes. Wear dark glasses to reduce eye strain during healing.

Pharmacological

If pain relief is required, avoid aspirin as it may increase bleeding.

References

1. Maloney GE, Fraser WR. In: Medicine Health. Allesson RW, Graham RH (eds). American Academy of Ophthalmology, 2005.
2. Black Eye: First aid. In: First Aid Guide. Mayo Foundation for Medical Education and Research, 2007.
3. Black Eye Causes, Symptoms, Diagnosis, Treatment. http://www.emedicinehealth.com/black_eye/article_em.htm accessed on 19.9.12.

FRACTURES

A fracture is a break in the structural continuity of a bone.

Clinical Features

- Pain, swelling, tenderness,
- Loss of function, deformity, shortening,
- Crepitus,
- Abnormal mobility and loss of transmitted movement, singularly or in combination.

Treatment

Emergency care of fractures at the site of accident (first aid)

- All trauma patients with a cervical spinal column injury should be immobilized using a combination of a rigid cervical collar and supportive blocks on a backboard with straps at the scene and expeditiously transported to nearest hospital.
- ***If injury to the spine is suspected, carefully move the person from the site of accident in one piece like a log of wood without any twisting or flexion.***
- Give temporary immobilization (called splintage) after grossly correcting the deformation without moving or manipulating much with either wooden stick/ an umbrella/a folded magazine or newspaper, a fractured lower limb temporarily can be supported and tied with opposite lower limb for splintage and transfer of patient; a fractured upper limb can be splinted by supporting it on the chest wall and wrapping any cloth piece around it. Take a note of the colour of the finger or toes before applying splintage.
- If the patient has an open fracture with excessive bleeding, avoid trying any circumferential ligature to any part of the limb to stop the bleeding (unless the bleeding is life-threatening) as the ligature can be more injurious to the distal circulation of the limb.

Care of patient in the emergency department

Control haemorrhage, provide pain relief, prevent ischaemia-reperfusion injury, and remove potential sources of contamination (foreign body and nonviable tissues).

(a) Patient with fracture in an extremity. Splint the limb with either Crammerwire (a malleable metallic support) or a slab or goose splint (thin layers of wood adhered to cloth) or a Thomas splint (for femoral fractures) or Bohler Braun splint (for fractures around the knee or leg bones fractures); include the proximal and the distal joint of the fractured segment of the limb in splintage (Table 2.11).

Table 2.11. Splinting in injured/fractured part of the limb

Injured/fractured part of limb	Extent of splintage
Fingers (phalanges)	Support with adjacent finger (called Buddy strapping).
Hand (metacarpals)	Terminal pulp of fingers to proximal third of forearm.
Wrist (carpals or lower end of radius or ulna)	
Elbow and forearm (lower end of humerus or upper end of radius or ulna)	
Distal palmar crease to upper one-third-forearm.	
Distal palmer crease to upper one-third of arm.	
Arm (humerus)	Middle one-third of forearm to base of neck
(include shoulder).	
Foot and ankle (tarsals or metatarsals)	

Leg (tibia or fibula)	
Base of toes to upper one-third of leg.	
Base of toes to upper one-third of thigh (include knee and ankle). Can apply Bohler-Braun splint also.	
Knee (lower end of femur or upper end of tibia)	Just above the malleoli to upper one-third of thigh.
Thigh (femur)	Base of toes to nipple line on trunk. The better option is application of Thomas splint.
Pelvic	See section on pelvic fractures.

(b) Any open wound is dressed before application of splintage. For wounds of open fractures, irrigation of the wound with copious amount of saline (0.9% NaCl) helps to remove dirt and foreign particles/bodies. The definitive treatment should be provided by an orthopaedic surgeon after radiological examination.

- (c) **Multiple injuries.** Remove clothing and examine the patient rapidly from head to toe.
- Ensure patency of the airway.
 - Perform throat suction, if secretions are present in the throat.
 - The neck may be “gently” turned to one side to prevent aspiration and ensure patent airway and breathing.
 - Check for pneumothorax or a flail segment and take appropriate measures (see section on Thoracic Trauma for details).
 - Record vital parameters. Assess the level of consciousness according to Glasgow Coma Scale. Establish intravenous line and catheterize the patient (see section on Coma for details).
 - Splint the limbs and note down distal neurovascular status. The patient, if required to be shifted, is handled with great care as patient might be having spinal injury.

Pharmacological

1. Inj. Diclofenac sodium 75 mg IM stat for pain relief.
(**Caution:** Do not give any sedative or centrally acting analgesic like morphine or its derivatives)
2. Inj. Tetanus toxoid 0.5 ml IM stat, if open injuries or wounds.
3. IV fluids for management of haemorrhagic shock (see section on Shock). Give an initial rapid fluid bolus of 1-2 liters of Ringer’s lactate in the adult patient and 20 ml/kg in the paediatric patient.
4. Send blood for grouping and cross-matching.
5. Catheterize the patient for measuring urine output as the latter is one of the most reliable clinical parameters to assess the adequacy of visceral perfusion and it also helps in the assessment of IV fluid to be transfused.
6. In case of open fractures, give intravenous antibiotics after sensitivity testing.
7. The antibiotics should be continued for at least a period of 7-14 days.

Inj. Cloxacillin 500 mg 6 hourly (50-100 mg/kg in children) Inj. Gentamicin 80 mg 12 hourly (5-7.5 mg/kg in children)

Or

Inj. Cefotaxime 1 g 12 hourly (100-200 mg/kg in children) Inj. Amikacin 500 mg 12 hourly (15 mg/kg in children)

Or

Inj. Ceftriaxone 1 g 12 hourly (50-100 mg/kg in children) Inj. Amikacin 500 mg 12 hourly (15 mg/kg in children)

References

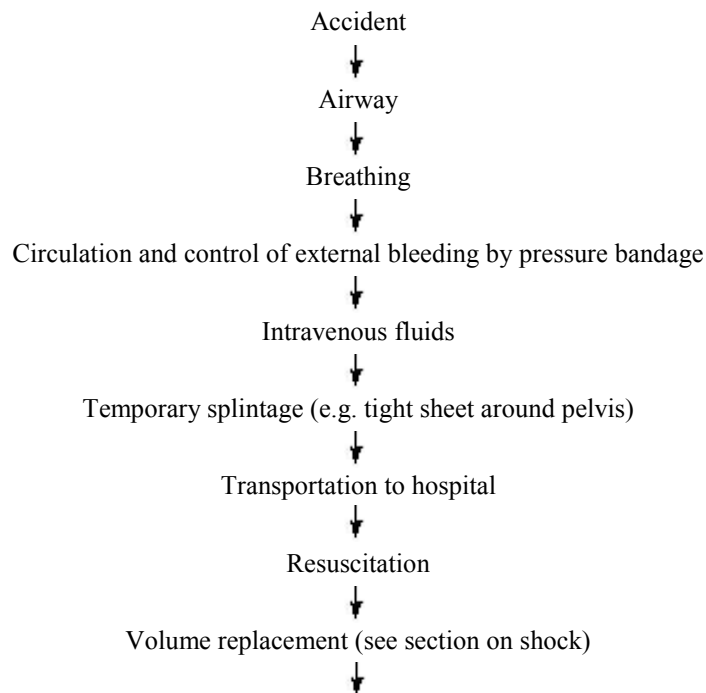
1. Principles of Fractures and Dislocations. In: Rockwood and Green's Fractures in Adults. Charles A, Rockwood Jr, David P Green, Robert W Bucholz et al (eds), 4th Edition, Volume 1, Lippincott-Raven, Philadelphia, New York, 1996.
2. Complications of Fractures. In: Rockwood and Green's Fractures in Adults. Charles A, Rockwood Jr., David P Green, Robert W. Bucholz et al (eds). 4th Edition, Volume 1, Lippincott-Raven, Philadelphia, New York, 1996.
3. Fractures-AAOS-American Academy of Orthopaedic Surgeons. <http://orthoinfo.aaos.org/> Accessed on 19.9.12.

PELVIC FRACTURES

Classification

Pelvic fractures are generally divided into two types based on amount of energy involved:

- i. Low energy fractures resulting in isolated fractures of individual bones of pelvis without disruption of pelvic ring.
- ii. High energy fractures generally producing pelvic ring disruption.



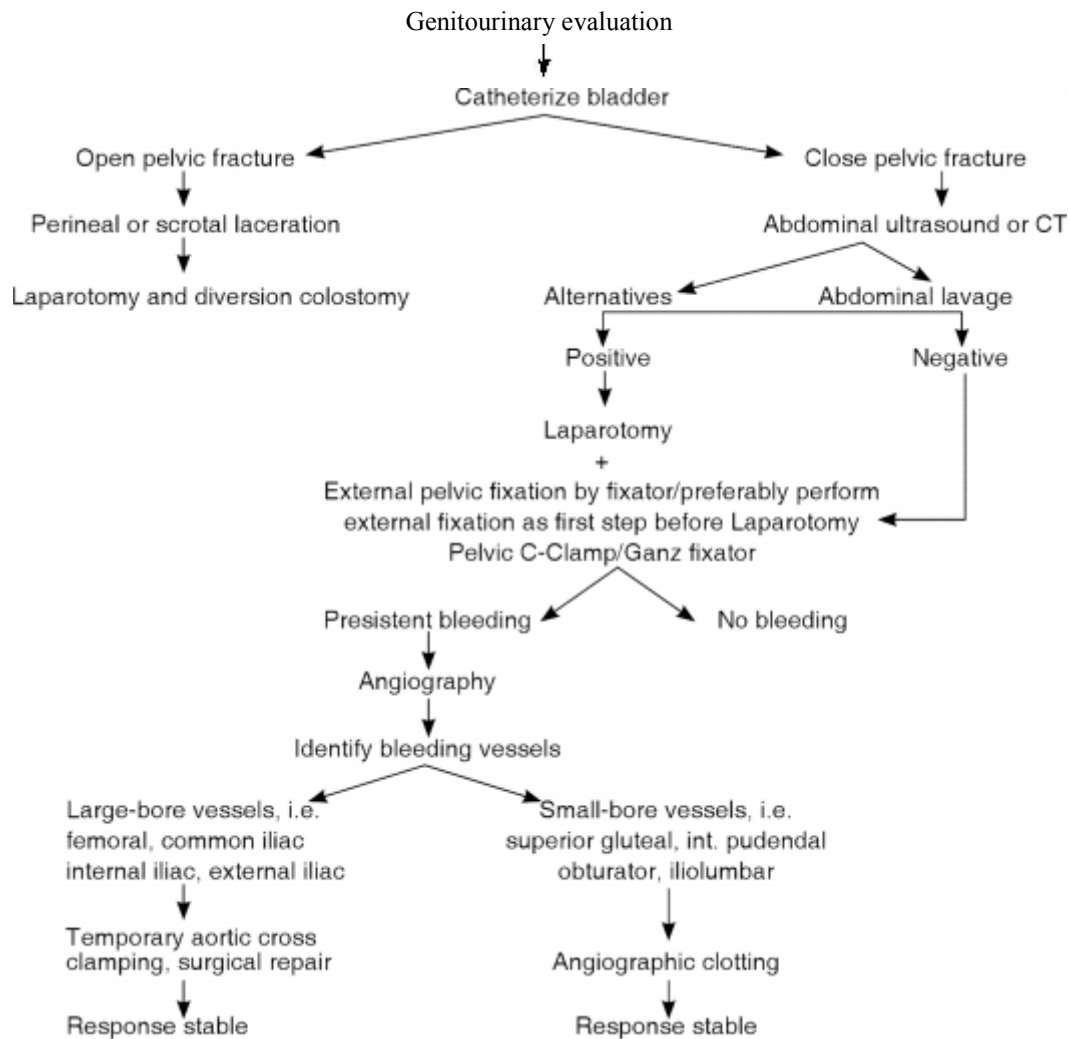


Fig. 2.9. Pelvic fractures: Therapeutic measures for the control of haemorrhage.

Evaluation

- Evaluate the patient with attention to ABC of trauma care (i.e. airway, breathing and circulation). Conduct a primary survey and note baseline vital signs and neurological status.
- Assess pelvic stability, very carefully, by pushing anterior superior iliac spines towards each other and then apart (preferably perform this manoeuvre once only). Perform perineal and digital rectal examination.

- Secondary detailed survey is carried out once the patient's condition is stable and X-rays and other relevant investigations are done.

Treatment

As a primary aid, pelvis can be quickly and temporarily stabilized by wrapping a sheet tightly around it. Isolated stable pelvic bone fractures are treated by bed rest (for symptomatic duration) and analgesics, followed by gradual mobilization and weight bearing.

Treatment of unstable pelvic ring disruptions (Fig. 2.9) includes:

- Volume replacement (see section on Shock).
- Control haemorrhage—Apply pressure dressing for conspicuous external bleeding. Open pelvic fracture wounds can be packed to control bleeding. Apply external fixator as a resuscitative measure in patients with demonstrable haemodynamic instability after an initial fluid bolus.
- As an alternative to fixator, pelvic clamp can be applied, but it is not a popular modality as complication rate with this clamp is higher than fixator (**Caution:** Pelvic clamp is contraindicated for iliac wing fracture close to the sacroiliac joint).
- Urological management—Catheterize the urinary bladder to document urinary output as a crucial determinant of adequate volume resuscitation. Blood at urethral meatus/ inability to void urine/perineal haematoma/high riding prostate indicate urethral injury. Microscopic haematuria indicates bladder contusion.

Further management is required in consultation with general surgeon.

(a) Gastrointestinal injuries: Concomitant small bowel/large bowel/rectal/anal tears or perforation can occur. Peritoneal lavage and abdominal CT are required to exclude GI trauma with close pelvis fractures (For details see section on Trauma).

Reference

1. Fractures and Dislocations of the Pelvic Ring. In: Chapmans Operative Orthopaedics. Chapman MW (ed) Lippincott Williams and Wilkins 2000.

SNAKE BITE

The poisonous snakes found in India most commonly- Naja naja (Indian Cobra) and Bungarus coeruleus (Indian Krait), Viper russelle (Russells' Viper) and Echis carinatus (saw scaled viper).

Elapid envenomization (neurotoxic)

- **Cobra bite**-pain and numbness at the site of the bite and lassitude, drowsiness followed by a sense of clouding consciousness, growing dimness of vision, difficulty in breathing, weakening of pulse, tachycardia, drooping of eyelids and difficulty in speech. Initially there is dribbling of saliva, paralysis of the tongue and laryngeal muscles, and the patient passes into coma. At this stage, respiration ceases and convulsions appear, but the heart continues to beat for some time after respiratory paralysis.
- **Krait envenomization**- similar, but pain and swelling may be absent at the site of the bite

with the result that even a suspicion of snake bite may not be aroused. Later on, however, the patient may complain of severe cramp-like pains in the abdomen.

Viperine envenomization (haemovasculotoxic)

Viperid bite - burning pain at the site, oedema with painful lymphangitis and regional lymphadenitis, bluish purple tinge in the affected area 12 hours or more following the bite, with petechial haemorrhages and haematoma. Epistaxis, melaena, haematemesis and haematuria. In severe cases, vomiting and incontinence of faeces and urine may be seen followed by a fall in blood pressure resulting in an acute excitatory collapse, ending in death.

Diagnosis

- A bite from a venomous snake may show one or more punctures, a small abrasion and perhaps a linear laceration.
- viper envenomization-local swelling, blood-stained sputum and nonclotting of blood
- Indian cobra bite-local sucking after 1-2 hours.
- Ptosis and glossopharyngeal palsy (Elapid envenomization)

Treatment

The aim is rapid and safe transport to a place where optimal medical care is available. [**Caution:** **Do NOT** make local incisions or pricks/punctures (“tattooing”) at the site of the bite or in the bitten limb, attempts to suck the venom out of the wound, use of (black) snake stones, tying tight bands (tourniquets) around the limb, electric shock,

topical instillation or application of chemicals, herbs or ice packs].

I. First aid measures

1. Ensure airway, breathing and intravenous access.
2. Keep the patient warm, and at rest. Activity may enhance the spread of venom.
3. Immobilize the whole of the patient’s body by laying him/her down in a comfortable and safe position and, especially, immobilize the bitten limb with a splint or sling.
4. Avoid any interference with the bite wound (incisions, rubbing, vigorous cleaning, massage, application of herbs or chemicals). Wipe the bitten site and cover loosely with a piece of clean cloth. Leave the blisters undisturbed. Allow them to break spontaneously.
5. For pain, a mild, non-sedating analgesic can be administered (paracetamol).
6. A tourniquet (constricting band in the form of a strap or belt, etc.) can be applied lightly approximately 10 cm above the bite. Once applied, the tourniquet should be loosened or removed only after antivenom administration has begun.

II. Investigations

Simple bedside examination: Measure limb circumference 10 cm proximally to the bite and repeat every 2-4 hourly, single breath count – 1001, 1002, ..., breath holding time and chest expansion measurement and look for dropping of upper eyelids. Keep on monitoring the patient and repeat all above, every 1-2 hourly.

Bedside tests: BT, CT & 20 minute Whole Blood Clotting Test (20WBCT).

IV. Hospital measures

Early clues that a patient has severe envenoming:

- Snake identified as a very dangerous one.
- Rapid early extension of local swelling from the site of the bite.
- Early tender enlargement of local lymph nodes, indicating spread of venom in the lymphatic system.
- Early systemic symptoms: collapse (hypotension, shock), nausea, vomiting, diarrhoea, severe headache, “heaviness” of the eyelids, inappropriate (pathological) drowsiness or early ptosis/ophthalmoplegia.
- Early spontaneous systemic bleeding. Passage of dark brown/black urine.

Observe every case of alleged snake bite for at least 24 hours before discharging.

1. Check for and monitor the following:
 - a. Pulse rate, respiratory rate, blood pressure and WBC count every hour.
 - b. Blood urea, creatinine, WBC count.
 - c. Urine output, urine for RBCs (in case of Viper bite).
 - d. Vomiting, diarrhoea, abnormal bleeds.
 - e. Extent of local swelling and necrosis. ECG, arterial blood gas analysis, BT, CT, PTT (to be repeated 6 hourly, if abnormal).

2. **Antivenom therapy.** Given only when features of systemic envenomation are present and in case of local swelling involving more than half of the bitten limb (in the absence of a tourniquet) within 48 hours of the bite, swelling after bites on the digits (toes and especially fingers), rapid extension of swelling (beyond the wrist or ankle within a few hours of bite on the hands or feet), development of an enlarged tender lymph node draining the bitten limb.

However, in pregnant woman bitten by a poisonous snake, give antivenom therapy, if there is a slowing of the fetal movements even if the woman herself is asymptomatic.

It is most effective in the first few hours after the bite, may reverse systemic envenoming even when this has persisted for several days or, in the case of haemostatic abnormalities, for two or more weeks. The lyophilized powder is dissolved in distilled water or normal saline to make a clear solution before use.

(Caution: Do not use, if reconstituted solution is opaque to any extent).

Dosage regimen

Dose of antivenom varies from case to case. A rough guideline is as follows:

- a. For bites with local swelling but no systemic features: 20-50 ml.
- b. If the swelling has progressed beyond the bitten site and there are mild systemic features or bleeding diathesis: 50 to 100 ml.
- c. If there are marked local and systemic features with haemolysis, clotting abnormalities, etc.: 100-150 ml.
- d. Children also be given exactly the same dose of antivenom as adults.

Inj. Hydrocortisone 200 mg and pheniramine maleate 22.75 mg should be given prior to the administration of antivenom in high-risk cases (hypersensitivity to animal serum such as equine antivenom, tetanus-immune globulin or rabies-immune globulin in past, severe atopic conditions and should be given antivenom only if they have signs of systemic envenoming).

Procedure of antivenom therapy

Reconstituted freeze-dried antivenom or neat liquid antivenom is given by slow intravenous injection (not more than 2 ml/minute).

Or

Reconstituted freeze-dried or neat liquid antivenom is diluted in approximately 5-10 ml of isotonic fluid per kg body weight (i.e. 250-500 ml of isotonic saline or 5% dextrose in the case of an adult patient) and is infused at a constant rate over a period of about one hour. All patients should be watched carefully for two hours after the completion of antivenom administration.

Persistence or recurrence of blood incoagulability after 6 hours or of bleeding after 1-2 hours or deteriorating neurotoxic or cardiovascular signs after 1-2 hours repeat the initial dose. Repeat every 6 hours until coagulation is restored. If large doses have been administered and the coagulation abnormality persists, give fresh frozen plasma (FFP) or factors.

[**Caution:** Antivenom must NEVER be given by the IM route, if it could be given intravenously. Antivenom should never be injected into the gluteal region (upper outer quadrant of the buttock) as absorption is exceptionally slow and unreliable and there is always the danger of sciatic nerve damage, when the injection is given by an inexperienced operator. Do not inject the antivenom locally at the bite site since it is not effective.]

At the earliest sign of a reaction: Antivenom administration must be temporarily suspended; keep Epinephrine (adrenaline) (0.1% solution, 1 in 1,000, 1 mg/ml) ready. ***Skin/conjunctival hypersensitivity testing does not reliably predict early or late antivenom reactions and is not recommended.***

In patients envenomed by vipers, after an initial response to antivenom (cessation of bleeding, restoration of blood coagulability) signs of systemic envenoming may recur within 24-48 hours.

Conservative treatment, when antivenom is NOT available or run out or where the bite is known to have been inflicted by a species against whose venom there is no available specific antivenom.

Neurotoxic envenoming with respiratory paralysis: Assisted ventilation with room air or oxygen has been followed by complete recovery, even after being maintained for periods of more than one month. Manual ventilation (anaesthetic bag) by relays of doctors, medical students, relatives and nurses has been effective where no mechanical ventilator was available. Administer anticholinesterases, Inj. Neostigmine 0.56 mg half hourly, if there are signs of neuromuscular paralysis. Give Inj. Atropine 0.6 mg IV before every injection of neostigmine to block its muscarinic side effects. Oxygen, assisted ventilation, etc. if there is respiratory failure.

Haemostatic abnormalities: Strict bed rest to avoid even minor trauma; transfusion of clotting factors and platelets; ideally, fresh frozen plasma (FFP) and cryoprecipitate with platelet concentrates or, if these are not available, fresh whole blood. Avoid intramuscular injections.

Shock, myocardial damage: Correct hypovolaemia with colloid/crystalloids, controlled by observation of the central venous pressure. Ancillary pressor drugs (dopamine or epinephrine-adrenaline) may also be needed (for details see section on Shock). Treat patients with hypotension associated with bradycardia with atropine.

Acute kidney injury: Conservative treatment or dialysis.

Dark brown urine (myoglobinuria or haemoglobinuria): Correct hypovolaemia with intravenous fluid, correct acidosis with a slow intravenous infusion of 50-100 mmol of sodium bicarbonate and, by analogy with crush syndrome, consider a single infusion of 20% mannitol 200 ml

intravenously over 20 minutes. Must not be repeated as there is a danger of inducing dangerous fluid and electrolyte imbalance.

Severe local envenoming: Local necrosis, intracompartmental syndromes and eventhrombosis of major vessels is more likely in patients who cannot be treated with antivenom. Surgical intervention may be needed but the risks of surgery in a patient with consumption coagulopathy, thrombocytopenia and enhanced fibrinolysis must be balanced against the life-threatening complications of local envenoming. Give prophylactic broad-spectrum antimicrobial treatment

Other measures

1. Clean the bitten site with povidone-iodine solution, but do not apply any dressings.
2. Leave blisters alone. They will break spontaneously and heal. If there is local necrosis, excise and apply saline dressings. Surgical decompression may be necessary in some cases.
3. Tetanus toxoid injection must always be given.
4. Prophylactic antibiotic.
5. Aspirin or other mild analgesic for pain.
6. Diazepam 5-10 mg for sedation in some cases.
7. Rehydration and nutrition.

Management of venom ophthalmia

1. Urgent decontamination by copious irrigation .
2. Instill topical 0.5% adrenaline in the eye .
3. Topical administration of local anaesthetics (e.g.tetracaine) .
4. Exclude corneal abrasions by fluorescein staining with a slit-lamp examination and application of prophylactic topical antibiotics .
5. Prevent posterior synechiae, ciliary spasm and discomfort with topical cycloplegics
6. Antihistamines in case of allergic keratoconjunctivitis.

(Caution -Topical or intravenous antivenom and topical corticosteroids are contraindicated.)

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ANIMAL BITES

DOG BITES (RABIES)

Rabies can be transmitted by dog bites or licking of rabid animals on abraded skin and intact mucosa. Also by cat, monkey, horse, sheep, goat, mongoose, jackal, fox, hyena and bat.

Clinical Features

- **Prodromal symptoms**—such as headache, malaise, sore throat and fever last about 3-4 days. Pain and tingling at the bitten site.
- **Stage of excitation**—intolerance to noise, bright light or a cold draught, aerophobia, hydrophobia is a characteristic symptom of rabies. Examination shows increased reflexes, dilatation of pupils, increased sweating, lacrimation and salivation. Mental changes include fear of death, anger, irritability and depression. Convulsions may occur resulting in death.
- The **last stage** is that of paralysis and coma. The total duration of illness lasts for 2-3 days.

A. Treatment (post-exposure prophylaxis)

The WHO recommended classification (Table 2.12) of animal bite for post-exposure treatment should be followed. Every instance of human exposure to a suspected rabid or wild animal must be treated as a category III.

1. Management of wound: The wound is flushed and washed with plenty of soap and water (avoid direct touching of wounds with bare hands). Punctured wounds should be irrigated with the help of catheters followed by, 70% alcohol or povidone iodine application.

(**Caution - DO NOT** suture bite wounds immediately. If suturing is required, hold it for 24-48 hours, applying minimum number of stitches under the cover of antirabies immunoglobulin locally.)

2. Passive immunization with rabies immunoglobulin (RIG): Local infiltration of RIG in category III rabies—RIG should be infiltrated in the depth and around the wound even if the lesion has begun to heal followed by administration of antirabies vaccine.

(**Caution:** RIG should never be administered in the same syringe or at the same anatomical site as vaccine).

3. Active immunization with antirabies vaccine: Human Diploid Cell vaccine (HDCV)/Purified Chick Embryo Cell Vaccine (PCEC)/Purified Vero Cell Rabies Vaccine (PVRV).

Antitetanus treatment can be given after local wound treatment.

Table 2.12. WHO guide to post-exposure treatment against rabies

Category	Type of contact with a suspect or confirmed rabid domestic or wild ^a animal, or animal unavailable for observation	Type of exposure	Recommended treatment
I	Touching or feeding animals of Licks of intact skin	None	None, if reliable case history is available
II	Nibbling of uncovered skin Minor scratches or abrasions without bleeding	Minor	<ul style="list-style-type: none"> Wound management: Administer vaccine immediately^b. Stop treatment, if animal (dog or cat only) remains healthy throughout an observation period^c of 10 days^c or if animal is killed humanely and

Category	Type of contact with a suspect or confirmed rabid domestic or wild ^a animal, or animal unavailable for observation	Type of exposure	Recommended treatment
			found to be negative for rabies by appropriate laboratory techniques
III	Licks on broken skin Single or multiple transdermal bites or scratches Contamination of mucous membrane with saliva (i.e. licks) Bite with bleeding	Severe	<ul style="list-style-type: none"> Wound management Administer rabies immunoglobulin and vaccine immediately
(a)	Exposure to rodents, rabbits and hares seldom, if ever, requires specific antirabies treatment.		
(b)	If an apparently healthy dog or cat in or from a low-risk area is placed under observation, the situation may warrant delaying initiation of treatment.		
(c)	This observation period applies only to dogs and cats. Except in the case of threatened or endangered species, other domestic and wild animals suspected as rabid should be killed humanely and their tissues examined using appropriate laboratory techniques.		

Doses of rabies immunoglobulin (IG)

Human rabies immunoglobulin (HRIG) 20 IU/kg (max 1500 IU), available in concentration of 150 IU/ml, it does not require any prior sensitivity testing. **SHOULD**

NEVER BE INJECTED INTRAVENOUSLY. The antirabies sera should always be brought to room temperature (20-25°C) before use.

Or

Equine antirabies serum (ERIG) 40 IU/kg (max 3000 IU), available in concentration of 300 IU/ml, given after prior skin sensitivity testing, single dose on day 0. Half the dose is infiltrated around the bitten wound and the rest is given IM.

(Caution: A negative skin test must never reassure the physician that no anaphylactic reaction will occur. Avoid alcohol, glucocorticoids and chloroquine during vaccination; avoid multiple needle injections into the wound. Must not exceed the total recommended dose of IG as it may reduce the efficacy of the vaccine).

If the calculated dose of IG is insufficient to cover infiltration in all wounds, sterile saline can be used to dilute 2 or 3 fold to permit thorough infiltration. *RIG is not indicated beyond the seventh day* after administration of the first dose of vaccine.

Antirabies vaccine (ARV)

Intramuscular schedule: The course for post-exposure prophylaxis consists of five injections (days 0, 3, 7, 14 and 28) irrespective of severity of exposure. The 6th injection (day 90) is optional for immunologically deficient and extremes of age and on steroid therapy. The dose of vaccine per injection

is 2.5 IU/dose/ml for HDCV and PCEC vaccines and 0.5 ml for PVRV irrespective of age and weight of vaccine. Preferable site is deltoid; anterolateral thigh in children (**Caution:** Must **NOT** be given into gluteus muscle).

Intradermal (ID) schedule: The same vaccine is used approved by DCGI for ID administration as per following schedule:

(i) The 2 site ID TRC schedule (2-2-2-0-1-1) to be administered: One ID injection of 0.1 ml per ID site over each right and left deltoid on days 0, 3, 7 and 0.1 ml at a single site on days 28 and 90 or as per updated TRC schedule (2-2-2-0-2) on days 0, 3, 7 and 28.

Note: *Correct ID injection should result in a raised papule with an orange peel appearance. If a papule is not observed, the needle should be withdrawn and vaccine re-administered correctly nearby.*

(ii) The 8-site ID method (8-0-4-0-1-1) for use with HDC/PCECV in emergency, when no RIG is available.

The intradermal route is preferred as it reduces cost but must not be used in case of immunocompromised patients, individuals receiving long-term corticosteroids or other immunosuppressive therapy or chloroquine.

Antirabies vaccine should be kept and transported at a temperature range of +2°C to 8°C. The reconstituted vaccine should be used immediately or within 6-8 hours of reconstitution.

B. Post-exposure treatment of persons previously vaccinated

Managing re-exposure following post-exposure treatment with nervous tissue vaccine (NTV)

Persons who have received full post-exposure treatment with NTV should be considered as a fresh case and may be given treatment as per merits of the case. If within 6 months, a patient of category I has been exposed to a category II or category III wound, a full course of that type of exposure is indicated. However, if the patient has been treated earlier for a category II or category III exposure and the next exposure is also of same class, only two boosters of ARV 0.5 ml/1 ml intramuscularly or 0.1 ml at 1 site intradermally on day 0 and 3.

Managing re-exposure following post-exposure treatment with tissue culture vaccine (TCV)

If re-exposed, persons who have previously received full post-exposure treatment with a potent cell-culture vaccine should be given only two booster doses, intramuscularly (0.5 ml/1 ml)/intradermally (0.1 ml at 1 site) on days 0 and 3, but no rabies immunoglobulin. Proper wound toilet should be done.

C. Pre-exposure prophylaxis

Indications: Laboratory staff working with rabies virus, veterinarians, animal handlers and wildlife officers. Three full IM or ID doses of tissue culture vaccine given on days 0, 7, and 28.

Laboratory staff and others at high continuing risk of exposure should have their neutralizing antibody titer checked every 6 months. If it is less than 0.5 IU/ml, a booster dose of vaccine should be given. Such individuals on getting exposed to rabies virus after successful pre-exposure immunization require only two booster injections of vaccine given on days 0 and 3 without any antirabies serum/RIGs.

References

1. Rabies Virus and other Rhabdovirus Infections. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp 1611-1617.
2. National Guidelines for Rabies Prophylaxis and Intradermal Administration of cell culture Rabies Vaccines. National Institute of Communicable Diseases. Directorate General of Health Services.

Government of India; 2007.

3. Rabies Pre and Post-exposure Treatment in Humans. World Health Organization Department of Communicable Disease Surveillance and Response. November 2002.

Rabies Fact Sheet N°99. World Health Organization. Revised 2006.

INSECT AND ARACHNID BITES AND STINGS CAUSING SKIN DISEASES

Mosquitoes and other biting flies

Most insect bites and stings cause small reactions that are confined to the area of the bite (localised reactions). They can usually be treated at home.

Treatment (for papular urticaria)

1. Tab. Cetirizine 10 mg once daily to relieve pruritus.
2. Topical antimicrobial preparation to prevent secondary bacterial infection (see section on pyogenic skin infections).

Bees, wasps, hornets and ants

Remove the sting and the venomous sac, if it has been left in the skin immediately by scraping it out, either with fingernails or using something with a hard edge, such as a bank card.

(**Caution:** Do not puncture the venomous sac or pinch the sting out with your fingers or a pair of tweezers).

Treatment

For minor bites and stings:

1. Wash the affected area with soap and water.
2. Place a cold compress (a flannel or cloth cooled with cold water) over the affected area to reduce swelling.
3. Do not burst the blister or scratch the area because it can become infected. If the bite or sting is painful or swollen:
 - Topical administration of ice pack or calamine lotion for symptomatic relief.
 - Systemic antihistamines and analgesics can be given to relieve pruritus or pain.
 - Systemic corticosteroids may be appropriate, if there are severe side effects.

Any person who collapses, or who complains of wheezing, feeling of anxiety or faintness, generalized itching, or tightness in the chest within approximately 1 hour of being stung by an insect should be treated as having anaphylactic shock (see section on Anaphylactic Shock).

Inj. Adrenaline 1 mg (as hydrogen tartrate) 0.5-1.0 ml IM injection of Adrenaline (1:1000 solution) repeated every 15-20 min, if required.

All patients should be observed at least for 24 hours for recurrent anaphylaxis. (For details see section on Anaphylaxis).

Treatment in Scorpion Bite

1. Simple analgesics, such as paracetamol and aspirin, can be given to relieve pain. Every

effort should be made to get the patient to a hospital as soon as possible.

2. Vasodilators, administered in a hospital setting within 24 hours of the attack, may attenuate the cardiovascular response and possibly reduce mortality.
3. In endemic area, species-specific antiscorpions sera may be available locally and this can be of value, if administered within few hours.

Treatment in Poisonous spiders' Bite

Poisonous spiders are endemic in the tropics and the southern hemisphere where they typically inhabit woodpiles, outhouses and dark corners of garages and houses.

1. Specific antivenoms.
2. Analgesics.
3. Muscle relaxants should be given to relieve pain and muscular spasms.
4. Oral corticosteroids, if administered within 24 hours of the attack, may reduce the risk of local necrosis and the incidence of disfiguring scars.

Reference

1. Insect bites and stings – Treatment. <http://www.nhs.uk/Conditions/Bites-insect/Pages/Treatment.aspx> accessed on 18.9.12.

INFECTIVE ENDOCARDITIS

Acute bacterial endocarditis (ABE) is usually caused by *S. aureus*, *Group A haemolytic Streptococci*, *Pneumococci* or *Gonococci*. Subacute bacterial endocarditis (SABE) is usually caused by *S. viridans* or other *streptococci*, rarely by other organisms. ABE may affect normal valves, especially in intravenous drug addicts while SABE complicates deformed/damaged valves or congenital heart disease (CHD).

Clinical Features

- Fever, toxaemia, clubbing, splenomegaly, anaemia, microscopic haematuria, a new onset or changing murmur, evidence of immune phenomena and metastatic infection.
- Complications such as congestive heart failure (CHF), mycotic aneurysm, embolic cardiovascular accident (CVA) or other phenomena may be the presenting features.

The diagnosis of bacterial endocarditis is based on clinical, laboratory and echocardiographic criteria. Definitive diagnosis requires positive blood cultures aided by positive echocardiogram (transoesophageal positive in >90%).

Treatment

Presumptive initial treatment for SABE should cover *S. viridans*, microaerophilic and anaerobic *streptococci*.

Inj. Crystalline Penicillin-G 12-18 MU/24 h after test dose in 6 divided doses + Inj. Gentamicin 3 mg/kg/day IV (or IM) in one dose for 2 weeks.

For Enterococci.

Inj. Crystalline Penicillin-G 18-30 MU/day after test dose (in 6 divided doses) + Gentamicin 3 mg/kg IV (or IM) in one dose for 2 weeks.

Or

Inj. Ampicillin 12 g/day, given 4 hourly may be substituted for crystalline penicillin-G

In acute bacterial endocarditis, cover for *staphylococci*:

Inj. Nafcillin IV 12 g /24 hrs in 4 to 6 equally divided doses for 6 weeks.

In penicillin sensitive individuals

Inj. Cefazolin IV 6 g / 24 hrs in 3 equally divided doses for 6 weeks

Or

Inj. Vancomycin 30 mg/kg /24 hrs IV in 2 equally divided doses for 6 weeks.

Methicillin resistant *Staphylococcus aureus* (MRSA) in native valve

Inj. Vancomycin 30 mg/kg /24 hrs IV in 2 equally divided doses for 6 weeks.

+ Inj. Gentamicin 3 mg/kg IV (or IM) in 2 or 3 equally divided doses for 2 weeks + Rifampicin

900 mg/ 24 hrs orally or IV in 3 equally divided doses for 6 weeks.

Cardiac surgery is required if:

1. No response to medical treatment (especially in prosthetic valve endocarditis).
2. Worsening heart failure and the lesion is correctable.
3. Acute onset cardiac complication due to infection, e.g. septal perforation/valvular damage/stroke perivalvular extension of infection.
4. Large (> 1 cm diameter) hypermobile vegetation with increased risk of embolism.

Antibiotic prophylaxis in high-risk patients

- Antibiotic prophylaxis should only be considered in patients at higher risk of IE: Prosthetic valve or a prosthetic material used for cardiac valve repair, patients with previous IE
- High-risk patients
- Patients with congenital heart disease
- Dental procedures requiring manipulation of the gingival or periapical region of the teeth or perforation of the oral mucosa;

Assess individual risk and develop an appropriate management plan with following:

Cap. Amoxycillin 3 g orally 1 hour preoperatively

Or

Cap. Clindamycin 600 mg 1 hour preoperatively

(For details see section on Antibiotic Prophylaxis in Chapter 18).

Higher risk patients with prosthetic valves, genitourinary procedures

Inj. Amoxycillin 2 g IV + Inj. Gentamicin 120 mg IV before procedure followed by Cap.

Amoxycillin 1 g orally 6 hours postoperatively.

Substitute Vancomycin 1 g IV infusion over 100 min in case patient is allergic to penicillin.

References

1. Management of Bacterial Endocarditis. Am Fam Physician. 2000; 61:1725-1732.
2. Bacterial Endocarditis: The Disease, Treatment, and Prevention. Circulation 2003; 107: e185-e187.
3. Guidelines on the prevention, diagnosis, and treatment of infective endocarditis (new version 2009). The Task Force on the Prevention, Diagnosis, and Treatment of Infective Endocarditis of the European Society of Cardiology (ESC). European Heart Journal 2009; 30: 2369–2413.
4. Infective Endocarditis. Braunwald's Heart Disease – 10th Edition Pg 1537-1540.

ACUTE PERICARDITIS

Inflammation of pericardium, acute or chronic is caused by viruses, bacteria, mycobacteria, connective tissue disorders, uraemia, myocardial infarction (MI), malignancies, radiation and trauma.

Clinical Features-Chest pain, dyspnoea, presence of friction rub, tamponade and serial ECG changes.

Treatment

Nonpharmacological - Bed rest.

Pharmacological

1. Tab. Aspirin 2-4 gram daily in divided doses for 1-2 weeks.
Or
Tab. Ibuprofen 600- 800 mg orally thrice daily for 1-2 weeks.
2. In the absence of relief within 48 hours (non-infective cases only) Tab. Prednisolone 0.2-0.5 mg/kg/ day with tapering over 4 weeks.
3. Antibiotics should be used only in case of documented purulent pericarditis empirically to cover *pneumococci*, *meningococci*, *staphylococci*, *H. influenzae* (Ampicillin + Gentamicin may be used).
4. Anticoagulants are not to be used except in case of prosthetic valves when Heparin may be used.
5. Treatment of primary disease causing pericarditis.

Pericardial effusion

Pericardial effusion occurs when pericarditis leads to accumulation of fluid in pericardial cavity. Echocardiography is diagnostic.

Treatment

- As above for pericarditis.
- Diagnostic tap for effusion.
- Pericardiocentesis in case of a large effusions or tamponade.
- Pericardiostomy with drainage for large effusions with rapid refilling.

Constrictive pericarditis

Restriction induced by a thickened fibrous pericardium most commonly by tuberculosis Treatment is surgical excision. Pericardiectomy for recurrent pericarditis or constrictive pericarditis.

Treatment

1. Antitubercular therapy (for details see section on Tuberculosis in Chapter 1).
2. Tab. Prednisolone 1 mg/kg for 2 weeks and then taper off in next 4 weeks.

Recurrent pericarditis

It may require intravenous methyl prednisolone pulses, colchicine 1 mg daily or pericardiectomy.

Reference

1. Pericardial Disease. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp. 1488-1495.
2. Acute Pericarditis. Braunwald's Heart Disease – 10th Edition Pg 1637-1640.

CARDIOMYOPATHY

Structural or functional abnormality of the ventricular myocardium.

Dilated congestive cardiomyopathy

Commonest type of cardiomyopathy usually caused by ischaemia and characterized by ventricular

dilatation and systolic dysfunction. The other important causes include alcohol, endocrinopathies (diabetes, thyrotoxicosis), myocarditis or idiopathic.

Clinical features -

- Oedema
- Dyspnoea.

Diagnosis

- Ecg,
- Chest x-ray
- Echocardiography.

Treatment

Symptomatic, management as in congestive heart failure (see respective section). Treat any underlying treatable cause.

Reference

1. The Cardiomyopathy and Myocarditis. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp 1951-1970.

HYPERTENSION

Usually asymptomatic and discovered on routine measurement of blood pressure. Secondary hypertension (HT) presents as a part of a symptom complex as in acromegaly, Cushing's disease, renovascular or renal parenchymal disease, connective tissue disorders (SLE, scleroderma, etc.), or coarctation of aorta.

Clinical Features

- Nonspecific symptoms are fatigue, headache, epistaxis.
- Uncontrolled hypertension can lead to target organ damage (TOD) such as coronary artery disease (CAD), left ventricular hypertrophy (LVH), cerebrovascular accidents (CVA), transient ischaemic attacks (TIA), retinopathy, peripheral vascular diseases including dissecting aneurysm, renal disease.
- Associated risk factors are — age >55 years in males and >65 years in females, smoking, diabetes mellitus, microalbuminuria or GFR <60 ml/min, hyperlipidaemia, family history, obesity, sedentary lifestyle and ethnic group.

Investigations

- Electrocardiogram
- Urinalysis
- Blood glucose and haematocrit
- Serum creatinine
- Serum electrolytes
- Lipid profile

Precautions to be taken while measuring BP

The auscultatory method of BP measurement with a properly calibrated and validated instrument should be used. BP should be measured using an appropriate size cuff in both upper limbs and at least one lower limb in both supine and erect posture. Patient should have been resting for at least 5 minutes and should not have consumed coffee, smoked during the last 30 minutes before measuring the blood pressure. At least 2 measurements should be made. Systolic BP is the point at which the first of 2 or more sounds are heard (phase 1) and diastolic BP is the point before the disappearance of sounds (phase 5).

Treatment

Nonpharmacological

- Reduce dietary sodium intake to no more than 100 mmol per day (2.4 g sodium or 6 g sodium chloride).
- Adopt DASH eating plan-diet rich in fruits, vegetables, with low fat dairy products with a reduced content of saturated and total fat.
- Lifestyle modification — exercise, weight control to maintain normal body weight (body mass index 18.5-24.9 kg/m²), moderation of alcohol consumption (1 oz or 30 ml ethanol; e.g. 24 oz beer, 10 oz wine, or 3 oz 80-proof whiskey), cessation of smoking, yoga.

Pharmacological

Table 3.2. Classification and management of blood pressure for adults aged 18 years or older

BP Classification	Systolic BP mmHg*	Diastolic BP mmHg*	Life-style modification	Management* Initial therapy	
				Without compelling Indication	With compelling indications [§]
Normal	<120 and	<80	Encourage		
Prehypertension	120-139 Or	80-90	Yes	No antihypertensive drug	Drug(s) for the compelling indication**
Stage 1 hypertension	140-159 Or	90-99	Yes	Thiazide type diuretic for most; may consider ACEI, ARB, beta blocker, CCB or combination	Compelling indication Other antihypertensive drugs as needed
Stage 2 hypertension	≥160 Or	≥ 100	Yes	2-drug combination for most (usually thiazide type diuretic and ACEI or ARB or beta blocker or CCB)*	Drug(s) for the compelling indication other antihypertensive drugs as needed

ACEI:	Angiotensin converting enzyme inhibitor; ARB:Angiotensin receptor blocker; CCB: Calcium channel blocker
*	Treatment determined by highest BP category
**	Treat patients with chronic kidney disease or diabetes to BP goal of less than 130/80 mmHg
§	Compelling indications — heart failure, post-myocardial infarction, high coronary disease risk, diabetes, chronic kidney disease, recurrent stroke prevention (for details see respective section).
♣	Initial combined therapy should be used cautiously in those at risk for orthostatic hypotension.

Drug(s) for the com-pelling indication**

Drug(s) for the com-pelling indication Other antihyperten-sive drugs as needed

Drug(s) for the com-pelling indication Other antihyperten-sive drugs as needed

Antihypertensive drug choices: Additional considerations

- (a) Diuretics—elderly, obese, congestive heart failure (CHF).
- (b) Beta-blockers—young, coronary artery disease (CAD), vascular headache, associated atrial fibrillation (AF).
- (c) Calcium channel blockers (CCB)—old age, CAD, atrial fibrillation (AF), paroxysmal supraventricular tachycardia (PSVT).
- (d) Angiotensin converting enzyme inhibitors (ACEI)—young, left ventricular failure (LVF), diabetes.
- (e) Angiotensin II receptor antagonists (ARB)—same as ACEI.
- (f) Alpha-blockers—prostatism, diabetes, dyslipidaemia.
- (g) Combined alpha and beta blockers—pregnancy.
- (h) Old drugs—alpha-methyl dopa (pregnancy), clonidine-refractory cases.

Drug combinations for patients with associated conditions

HT with angina	– Beta blocker + CCB
HT with heart failure	– Diuretic + ACEI
HT with diabetes mellitus	– ACEI + CCB
HT with COAD	– Diuretic + CCB

Isolated systolic hypertension (systolic BP \geq 160 mmHg)

Drugs of choice in order of preference are:

Diuretics.

Beta blocker.

Diuretic + beta blocker.

Diuretic + CCB.

ACEI + CCB.

Hypertension in pregnancy

Alpha-methyldopa, beta blockers and vasodilators are preferred medications for safety of the foetus. **ACEI and Angiotensin II receptor blockers are contraindicated** (for details see section on Eclampsia in Chapter 15).

Hypertension in children and adolescents

Be alert for possibility of identifiable causes of hypertension in younger children (i.e. kidney disease, coarctation of aorta). Lifestyle interventions are strongly recommended, with pharmacological therapy instituted for a higher levels of BP or if there is insufficient response to lifestyle modification.

Commonly used antihypertensive drugs

Tab. Hydrochlorothiazide 6.25-50 mg 1- 2 times a day

Or

Tab. Frusemide 40-80 mg 2-3 times a day

Or

Tab. Frusemide 20 mg + Spironolactone 50 mg 1-2 times a day

Or

Tab. Benzthiazide 25 mg + Triamterene 50 mg per day

Or

Tab. Indapamide 2-5 mg daily Or

Tab. Atenolol 25-100 mg daily or Metoprolol 25-150 mg 2 times a day.

(**Caution:** Contraindicated in asthma, peripheral arterial disease, moderate to severe congestive heart failure, uncontrolled hypothyroidism, myocardial conduction defects).

Or

Tab. Amlodipine 2.5-20 mg daily or Cap. Nifedipine 20-80 mg as sustained release daily.

(**Caution:** May cause peripheral oedema in some individuals)

Or

Tab. Enalapril 2.5 mg and may be increased to 40 mg daily or Lisinopril 2.5 to 20 mg daily or Ramipril 1.25 mg to 10 mg daily (**Caution:** May cause dry cough in some individuals).

Or

Tab. Losartan 25-100 mg 1-2 times a day.

Or

Tab. Prazosin 2-20 mg 2-3 times/day

Or

Tab. Terazosin 1-10 mg daily in 2 divided doses. First dose to be given at bed-time.

Or

Tab. Clonidine 0.1-0.6 mg 2 times a day.

Or

Tab. Methyldopa 250-1000 mg 2 times a day.

Accelerated hypertension

Patients presenting with BP 200/140 mmHg or more without papilloedema: Inj. Enalapril 1.25-5 mg IV 6 hourly

Or

Inj. Nitroprusside 0.25-1.0 mcg/kg/min IV infusion (dose to be titrated with BP, maximum dose for 10 mcg only)

Or

Inj. Nitroglycerine 5-100 mcg/min infusion

Or

Inj. Hydralazine 10-20 mg IV or IM, if no response at 20 mg change the drug

Or

Inj. Labetalol 20-80 mg IV every 5-10 min up to a total of 300 mg, infusion 0.5-2 mg/min, oral 100-600 mg 2 times a day.

Or

Inj. Phentolamine 5-15 mg IV (specially useful in pheochromocytoma)

Malignant hypertension

Patients presenting with BP 200/140 mmHg and evidence of vascular damage like papilloedema, deranged renal function, should be referred to a tertiary care centre.

Resistant hypertension

Resistant hypertension is the failure to reach goal BP in patients who are adhering to full doses of an appropriate 3-drug regimen that includes a diuretic. Refer these patients to hypertension specialist.

References

1. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. The JNC 7 report. JAMA 2003; 289: 2560-2572.
2. Hypertensive vascular disease. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp. 2042-2059.
3. Hypertensive vascular disease. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 19th Edition, McGraw Hill Company Inc., New York,; pp. 1624

ANGINA PECTORIS

Acute coronary syndrome (ACS) covers unstable angina (UA) to non-ST segment elevation myocardial infarction (NSTEMI) to ST-segment elevation myocardial infarction (STEMI).

Clinical Features

- Anginal pain is characterized by precordial or retrosternal discomfort or pressure or tight, squeezing, choking pain usually precipitated by exertion and relieved by rest and sublingual nitroglycerine. Pain may radiate to left shoulder, arm, neck or jaws.
- If anginal pain occurs at any time without any precipitating factor or increases in intensity or frequency, it is called unstable angina.

Investigations

- ECG – reversible ischaemic changes are seen during pain
- Elevated Cardiac biomarkers (trop-I, trop-T),
- Echocardiography, exercise testing,
- Radionuclide studies or coronary angiography
- Blood sugar, hba1c, lipid profile, apob, CRP, lipoprotein A, homocysteine, CPK, etc.

Treatment

Nonpharmacological

Avoid heavy exertion and take rest during acute stage, lifestyle modification, smoking cessation, weight control.

Pharmacological

1. For immediate relief, Tab. Isosorbide dinitrate 5-15 mg sublingual during the attack, dose repeated as required and tolerated. The onset of action is within 3 minutes.

Or

Tab. Nitroglycerin 0.3-0.6 mg sublingual during the attack, dose repeated as required.

2. If attacks are more than twice a week, regular drug therapy is required.
Tab. Isosorbide mononitrate 20 mg 2 times a day orally, may be increased to 120 mg per day, if required.
3. If no contraindications exist, Tab. Metoprolol 50 mg 2 times a day

Or

Tab. Atenolol 50 mg/day orally

4. If beta-blockers are contraindicated or angina persists, Tab. Diltiazem 60-120 mg/ day orally
5. Tab. Aspirin 100-150 mg per day orally

Or

If patient cannot tolerate Aspirin, Tab. Clopidogrel 75 mg/day.

6. If still ischaemia is not controlled, Tab. Nicorandil 20 mg 2 times a day can be started.

All patients with stable angina due to atherosclerotic disease should receive long-term aspirin and statin therapy. When adequate control of anginal symptoms is not achieved with beta-blockade, a calcium channel blocker should be added. Refer patients whose symptoms are not controlled on maximum therapeutic doses of two drugs to a cardiologist.

UNSTABLE ANGINA

Initial management (Patient should be hospitalized.)

1. Tab. Aspirin 300 mg stat. If aspirin is given before arrival at hospital, note saying that it has been given, should be sent with the patient.
2. Tab. Clopidogrel 300 mg stat followed by 75 mg/day, if available and no contraindications

to it.

3. Inj. Nitroglycerine 5 mcg/min IV infusion, increase dose by 2.5 to 5 mcg every few minutes until pain is controlled (monitor BP).
4. Continue other drugs as above.
5. Inj. Heparin—unfractionated—1000 U/h or low molecular weight heparin (Enoxaparine) 1 mg/kg (0.6 ml for 60 kg) 12 hourly.
6. Angioplasty/CABG may be done, if no relief with medication or disease is progressive.

MYOCARDIAL INFARCTION (MI)

The term myocardial infarction is used when there is evidence of myocardial necrosis in a clinical setting consistent with myocardial ischaemia.

Any one of the following criteria meets the diagnosis: Detection of rise and/or fall of cardiac biomarkers (preferably troponin) with at least one value above the 99th percentile of the upper reference limit—together with evidence of myocardial ischaemia with at least one of the following.

Clinical Features

- Chest pain similar to anginal pain is the commonest symptom, usually begins at rest, no response to nitrates, lasts >20 minutes
- Dyspnoea,
- Hypotension,
- Sweating,
- Altered sensorium and cyanosis.

Investigations

- Typical ECG changes.[new ST-T changes (STEMI) or new left bundle branch block],development of pathological Q waves .
- Echocardiography - evidence of new loss of viable myocardium or new regional wall motion abnormality.

Prehospital care

- Administer 162 to 325 mg of aspirin (chewed) to chest pain patients suspected of having STEMI unless contraindicated or already taken by patient.
- Perform and evaluate ECG
- Goal of transport time is to keep total ischaemic time within 120 minutes.

Treatment (preferably in CCU)

Nonpharmacological

- Diagnosis should be made as soon as possible (within 20 minutes of arrival in hospital). Admit in CCU (if available).
- Supplementary oxygen in patients with respiratory distress and oxygen saturation $\leq 94\%$, bed rest.
- Ensure IV access.

- Continuous cardiac monitoring and pulse oximetry.
- Avoid visitors and outside influences, e.g. radio, newspapers; therapeutic lifestyle changes, diet, restrict sodium intake.

Pharmacological

1. Inj. Morphine 2-4 mg IV, repeated 4-6 hourly, if needed.
2. Tab. Aspirin 150-325 mg PO administered as soon as possible on admission, if not taken earlier.
3. Tab. Clopidogrel 300 mg stat and 75 mg/day for maintenance, if available.
4. Tab. Nitroglycerine 0.3-0.6 mg sublingual.

First 24 hours:

5. Confirm MI by cardiac enzymes estimation and ECG.
6. Thrombolysis should be done within 6-12 hours with the following (There is slightly increased risk of intracranial haemorrhage—if age >65, weight <70 kg, hypertension, and with TPA).

Inj. Streptokinase 1,50,000 units IV as loading dose over 60 min

Or

Inj. Urokinase 1 to 2 Million International Units (max 3 Million International Units) administered IV once over 15-30 minutes. The rate of infusion is limited by side effects (fever, chills, rigors), and may need to be decreased in some patients.

Or

Inj. rt-PA 100 mg continuous IV infusion over 2 hours.

7. Primary PTCA may be done as an alternative to thrombolysis.
8. Close monitoring as mortality is maximum in the first 24 hours.
9. Adequate analgesia.
10. Limit physical activities at least for 12 hours.
11. Do not use prophylactic antiarrhythmics but should be readily available.
12. Inj. Enoxaparin 1 mg/kg subcutaneously 12 hourly for 3-5 days or Inj. Dalteparin 120 IU/kg subcutaneously 12 hourly or Inj. Heparin 1000 units/h IV infusion for 72 hrs. (more useful with TPA).
13. Inj. Nitroglycerin as in angina if pain continuing and no hypotension, bradycardia/excessive tachycardia (24-48 h).
14. If no contraindication, Inj. Metoprolol 2 mg IV every 2 minutes for 3 injections; if well tolerated follow with 50 mg PO started 15 minutes after last IV dose and given every 12 hourly for 48 hours. Then it may be changed to 100 mg once a day.
15. If no hypotension or contraindications and uncomplicated MI given Tab. Enalapril 5 mg 2 times a day PO.
16. Measure serum lipids and electrolytes.

After first 24 hours:

17. Continue aspirin, beta-blockers, nitroglycerine, heparin, ACEI, analgesia (if required).
18. Observe and treat any complication—high-dose aspirin, if pericarditis; diuretics, if congestive heart failure; defibrillation, if haemodynamic compromise in atrial fibrillation; atropine, if heart block/bradycardia; intra-aortic balloon, if severe hypotension.

Indications for urgent angiography/angioplasty

Ischaemic episodes (spontaneous/provoked) and preserved left ventricular systolic function.

Indications of temporary pacing

Sinus bradycardia unresponsive to drugs, mobitz type II AV block, third degree AV block, bilateral bundle branch block (BBB), newly acquired BBB, and bifascicular or trifascicular block.

Indications for urgent surgery

- Failed PTCA with persistent chest pain or haemodynamic instability.
- Persistent or refractory ischaemia which is not a candidate for catheter intervention. Cardiogenic shock and coronary anatomy not amenable to PTCA.
- Mechanical abnormality leading to pulmonary oedema/hypotension, e.g. papillary muscle rupture or acute ventricular septal defect.
- Life-threatening ventricular arrhythmias in the presence of $\geq 50\%$ left main stenosis and/or triple-vessel disease.

Long-term management (secondary prevention)

- Complete smoking cessation at every visit ask about smoking and assist patient in quitting.
- Initiate or maintain lifestyle modification—weight-control, increased physical activity, alcohol moderation, sodium reduction, and emphasis on increased consumption of fresh fruits, vegetables, and low-fat dairy products.
- BP control goal is $< 140/90$ mmHg or $130/80$ mmHg, if patient has diabetes or chronic kidney disease.
- Maintain LDL-C < 100 mg/L (for very high-risk patients, an LDL-C < 70 mg/dl); if TG are ≥ 200 mg/dl, non-HDL-C should be < 130 mg/dl whereas non-HDL-C should be < 100 mg/dl for very high risk with life style modification, diet, and hypolipidaemic agents.
- Physical activity 30 minutes 7 days/week (minimum 5 days per week).
- Weight management goal is to maintain body mass index 18.5 to 24.9 kg/m²; waist circumference: men < 40 inches, women < 35 inches.
- Aspirin, beta-blockers and ACEI (selected patients)—indefinite period. Those who do not tolerate aspirin give Tab. Clopidogrel 75 mg/day. For patients undergoing coronary artery bypass grafting, aspirin, (110-325 mg) should be started within 6 hours after surgery to reduce saphenous vein graft closure.
- Warfarin for compelling indication for anticoagulant therapy, such as atrial fibrillation, prosthetic heart valve, left ventricular thrombus, or concomitant venous thromboembolic disease. Use of warfarin in conjunction with aspirin and/or clopidogrel is associated with increased risk of bleeding and monitor closely.

References

1. Thygesen et al. Universal Definition of Myocardial Infarction. Expert Consensus Document. Circulation; 2007; Nov 27; 2634-53.
2. Coronary Syndromes : 2010 American Heart Association Guideline. Circulation. 2010;122:S787-S817.
3. Focused Update of the Guidelines for the Management of Patients with Unstable Angina/Non-ST Elevation Myocardial Infarction. ACCF/AHA 2012.
4. 2013 ACCF/AHA Guideline for the Management of ST-Elevation Myocardial Infarction. Downloaded from <http://circ.ahajournals.org/1> at VA MED CTR BOISE on April 17, 2013.
5. Unstable Angina and NSTEMI. NICE Guidelines 2010.
6. AHA/ACCF Secondary Prevention and Risk Reduction Therapy for Patients With Coronary and Other Atherosclerotic Vascular Disease: 2011 Update. Circulation 2011; 124: 2458-2473.

CONGESTIVE HEART FAILURE (CHF)

Clinical syndrome of inadequate cardiac output resulting in fluid retention in the lungs, abdominal organs and peripheral tissue. Common causes include coronary artery disease, hypertensive heart disease, cardiomyopathy, valvular heart disease, and pulmonary vascular disease.

Clinical Features

- Dyspnoea and peripheral oedema.
- Cyanosis may or may not be present.
- Raised JVP, S3 summation gallop and bilateral basal crepitations.
- Profuse pink frothy sputum in severe cases.
- Tender hepatomegaly and ascites.

Investigations

- Chest X-ray
- ECG
- ABG
- Echocardiography

Treatment

Identify precipitating factor – arrhythmias, fluid overload, thyroid disease, infection, anaemia, pregnancy, pulmonary embolism, dietary or medical noncompliance (for details see respective sections).

Nonpharmacological

- Restrict physical activity and take bed rest in propped up position with a back rest. Oxygen inhalation—high flow oxygen 10 liters/min through facemask or 60% venturi mask.
- Dietary sodium restriction (2-3 g/day; no added salt in cooking and no table salt). Fluid restriction depending on output and other conditions.
- Dialysis or ultrafiltration or mechanical fluid removal (ascitic tap, paracentesis, etc.).

Discontinue drugs with negative inotropic action (high dose beta blockers, calcium-antagonists, etc.).

Pharmacological

Treatment consists of a judicious mix of vasodilators, diuretics and inotropic support.

1. In severe/acute cases, Inj. Frusemide 40-80 mg IV stat and repeated after 2-3 hours. Individualize the maximum dose up to 200 mg/day. Maintenance dose is 40 mg IV 12 hourly till clinical improvement is seen.

High dose of Frusemide infusion, i.e. 10 mg/h undiluted and 1 mg/h as continuous infusion can be used in refractory patient.

2. Tab. Spironolactone 25-200 mg daily may be used in combination with above.

Or

Tab. Chlorothiazide 250-500 mg/day.

Or

Tab. Indapamide 2.5-5 mg/day.

Or

Tab. Benzthiazide 25 mg + Tab. Triamterene 50 mg/day.

3. Tab. Enalapril 2.5-20 mg/day may be given as a single or two divided doses.

Or

Tab. Lisinopril 2.5-20 mg/day as a single daily dose.

4. Tab. Isosorbide mononitrate 60 mg/day preferably as slow release preparation given at night.

5. Digoxin is indicated in fast ventricular rate (e.g. in atrial fibrillation).

Inj. Digoxin 1 mg IV, followed by 0.5 mg at 8 and 0.25 mg at 16 hours Or 0.5 mg followed by 0.25 mg PO at 8, 16 and 24 hours (rapid digitalization) followed by 0.125-0.375 mg/day as maintenance dose.

Or

Tab. Digoxin 0.5 mg first day, followed by 0.25 mg/day (slow digitalization).

5. Tab. Carvedilol 3.125 - 25 mg per day in single/or two divided doses (useful if persistent tachycardia, idiopathic dilated cardiomyopathy) — dose to be doubled, if required, only after 2 weeks.

6. Inj. Heparin 5000 U 12 hourly SC, if the patient is bed ridden.

References

1. 2009 Focused Update: ACCF/AHA Guidelines for the Diagnosis and Management of Heart Failure in Adults: A Report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines: Developed in Collaboration With the International Society for Heart and Lung Transplantation. *Circulation*. 2009;119:1977-2016.
2. Heart Failure and Cor Pulmonale. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp. 1901-1915.

PULMONARY EMBOLISM/INFARCTION

Pulmonary embolism may pass off unnoticed in case of a small embolism or present with a full blown acute cor pulmonale.

Clinical Features

- Dyspnoea, tachypnoea,
- Chest pain, haemoptysis and cough;
- Crepitations, rhonchi and occasionally pleural rub or signs of collapse accompanied by acute cor pulmonale, loud P2, RV S3, right ventricular heave,
- Raised JVP,
- Hepatomegaly,
- Pedal oedema, cyanosis

Predisposing factors for pulmonary embolism are surgery, immobilization, trauma, oral contraceptives, pregnancy, postpartum, cancer, chemotherapy, stroke, indwelling venous catheter.

Investigations

- Chest roentgenogram – oligoemia in lung fields and typical wedge-shaped infarction, arterial blood gas analysis.
- ECG changes S1-Q3-T3 pattern, incomplete RBBB or right ventricular ischaemia.
- Lung scanning and pulmonary angiography, D-Dimer ELISA and latex agglutination, LDH, echocardiography, contrast plethysmography and venous ultrasound for deep vein thrombosis.
- Blood cultures in case of septic emboli

Treatment

Primary therapy

A. Pharmacological

1. Inj. Streptokinase 2,50,000 units IV as loading dose over 30 min followed by 1,00,000 units every hour for up to 12-72 hours.

Or

Inj. Urokinase 4400 U/kg IV over 10 min then 4400 U/kg/hour administered as continuous IV infusion.

Or

Inj. rt-PA 100 mg continuous IV infusion over 2 hours.

2. Inj. Dobutamine IV infusion at the rate of 5 to 10 mcg/kg/min.
3. Oxygen 100% inhalation (except in cases of COPD/cor pulmonale).
4. Pain relief with NSAIDs or narcotics.

B. Catheter-based suction embolectomy, local mechanical dispersion, local pharmacological thrombolysis.

- C. Surgical embolectomy.
- D. Secondary prevention
 1. Inj. Heparin 5000-10,000 IU over 5 minutes followed by an IV infusion at the rate of 15-25 units/kg/hour. Check prothrombin time (PT) after 6 hours and titrate INR to 1.5 to 2.3 times control. Complete blood count (CBC) for heparin associated thrombocytopenia (HAT).
(**Caution:** Protamine sulphate is an antidote to overdosage with heparin with 1 mg neutralizing 100 IU of heparin given within 75 minutes (maximum 50 mg).
 2. Tab. Warfarin is initiated on the first day of documenting PT within therapeutic range in a dose of 10 mg daily for 2 days. The subsequent maintenance dose depends on PT with an overlap of 5 days with heparin (stop heparin, when INR>2). A target INR of 2.0 to 3.0 is achieved and therapy is continued for at least a year. (**Caution:** Vitamin K 1-10 mg acts as an antidote to warfarin overdose).
 3. Tab. Aspirin 75 mg/day following a full course of warfarin.
 4. Inferior vena caval (IVC) obstruction with green field or bird's nest filter to prevent recurrent embolization from deep vein thrombosis (DVT).

Reference

1. Deep Venous Thrombosis and Pulmonary Thromboembolism. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp 2170-2177.

ARRHYTHMIA

Clinical Features

Palpitations, anxiety, lightheadedness, angina, syncope or near syncope, hypotension and may lead to cardiac compromise.

When severe, these may suggest underlying cardiac disease, ischaemic heart disease (IHD), cardiomyopathy, myocarditis, conduction disorders, etc. or non-cardiac (thyroid disorders, electrolyte imbalances or drugs).

Diagnostic tests include ECG during attack of arrhythmia or 24-hour Holter monitoring (if no abnormality seen in ECG on presentation)

Treatment

Identify and treat precipitating factors.

SUPRAVENTRICULAR TACHYCARDIA

- Sustained regular narrow QRS tachycardia with normal appearing QRS (<120 msec) or may be broad QRS, if there is aberrancy.
- Onset is sudden with heart rate being 160-200/min, presents with palpitation. Hypotension may occur in some patients. Polyurea may follow the episode.

Nonpharmacological treatment

- Reassure the patient especially if no haemodynamic disturbance present at a time when the patient has symptoms.
- Vagal stimulation by drinking cold water, Valsalva manoeuvre, carotid massage, etc.

Pharmacological treatment

Acute attack is treated as follows (if no response to vagal stimulation):

Inj. Adenosine 3 mg as a rapid IV push into the large peripheral vein, 3 mg over 2 seconds with cardiac monitoring, if necessary followed by 6 mg after 1-2 minutes, and then by 12 mg after a further 1-2 minutes followed by a saline flush.

(**Caution:** Contraindicated in 2nd and 3rd degree heart block)

Or

Inj. Verapamil 5-10 mg bolus over 2-3 min repeated at 15-30 min, if necessary.

Or

Inj. Diltiazem 0.25 mg/kg slow IV repeated after 15 min. It can be continued as an infusion 10 mg/h up to 24 h.

Or

Inj. Metoprolol 1-2 mg/min IV at 5 min interval up to a total of 5-10 mg. Low energy (25-50 joules) DC shock may be used in resistant cases.

Maintenance treatment

Tab. Atenolol 25-100 mg/day as single or divided doses.

Or

Tab. Metoprolol 50-200 mg/day as a single dose or divided doses.

Or

Tab. Verapamil 40 mg thrice a day.

Or

Tab. Amiodarone 150-200 mg/day (in resistant cases).

Patient should be referred to a higher centre for maintenance treatment/definitive treatment.

VENTRICULAR TACHYCARDIA

- Run of three or more consecutive ventricular beats at a rate >120 beats/min. If the rate of consecutive ventricular beats is >100 /min, it is called accelerated idioventricular rhythm which is a benign condition, usually occurring following the thrombolytic therapy.
 - Diagnosis is made by ECG, suggested by independent P wave, fusion or capture beats, uniformity of QRS wave in the V leads (concordance) and a frontal plain QRS axis > -30 .
- A. Haemodynamically stable**
- Inj. Lidocaine 1 mg/kg IV bolus (3 ml) followed by repeated 0.5-1 mg/kg boluses at 5 min

intervals up to a total of 3 mg/kg to attain desirable response followed by IV infusion 2-4 mg/min. Endotracheal or IM administration in extreme cases (300 mg).

If no effect of Lidocaine and DC conversion is not available:

Inj. Procainamide 15 mg/kg loading dose followed by 2-5 mg/min maintenance infusion.

Note: Lidocaine (class 1B) is the drug of choice for ventricular tachycardia during acute ischaemia and myocardial infarction.

B. Haemodynamically unstable VT or no response to lidocaine

Synchronized DC shock starting with 50-200 Joules.

C. In ventricular fibrillation

Unsynchronized 200 Joules followed by 360 Joules, if required.

D. Maintenance treatment

Tab. Flecainide (class 1C) 100 mg 8-12 hourly.

Or

Tab. Procainamide (class 1A) 250-750 mg 4 to 6 hourly.

In refractory cases, Tab. Amiodarone (class III) 200-400 mg/day, starting at a higher dose of 200 mg 8 hourly for first week.

SUSTAINED ATRIAL FIBRILLATION

Sustained rapid irregular atrial rhythm associated with underlying heart disease, e.g. RHD, CAD, hypertension, thyrotoxicosis and alcohol ingestion.

Clinical features

Usually presents with severe palpitation, chest discomfort, weakness, breathlessness and sometimes signs/symptoms of arterial embolic phenomenon like stroke.

Treatment

Nonpharmacological

Reassurance, oxygen inhalation, propped up position, if patient is dyspnoeic.

Pharmacological

1. Rapid digitalization done as in section on CHF followed by maintenance dose.
2. Beta blockers (class II) like metoprolol 25-100 mg twice daily are also effective in controlling ventricular rate.
3. Tab. Warfarin 5 mg daily with titration as per INR (maintain about 1.5 to 2) in patients with documented clots or thromboembolic episodes. In cases of elective DC cardioversion (100 to 400 Joules), 3 weeks of anticoagulation required.
4. Treatment of underlying condition like thyrotoxicosis.

BRADYARRHYTHMIAS AND BLOCKS

Treatment

Pharmacological

Inj. Atropine 0.5-2 mg IV repeated 4-6 hourly, if needed. And/

Or

Inj. Dopamine 5-20 mcg/kg/min infusion, And/

Or

Inj. Isoproterenol 2-10 mcg/min infusion.

Definitive treatment is cardiac pacing

Reference

1. Tachyarrhythmias. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp. 1878-1900.

CHAPTER 4

BLOOD DISEASES

BLEEDING DISORDERS

PLATELET DISORDERS (THROMBOCYTOPENIA)

Low platelet counts suggest either reduced production or increased destruction of platelets.

Causes of Thrombocytopenia

Mechanism	Causes
Decreased production of platelets	Congenital bone marrow failure(e.g. Fanconi anaemia, Wiskott Aldrich Syndrome) Acquired bone marrow failure (e.g aplastic anaemia, myelodysplasia) Exposure to chemotherapy, irradiation. Marrow infiltration (neoplastic,infectious) Nutritional(Def. of VitB12,folate,iron; alcohol)
Increased destruction	Immune thrombocytopenia(Hep C and HIV related, drug induced) Heparin induced thrombocytopenia Thrombotic microangiopathy Disseminated Intravascular Coagulation Posttransfusion purpura Neonatal Alloimmune thrombocytopenia Mechanical(aortic valvular dysfunction,extracorporeal bypass) Von Willebrands disease type 2B Haemophagocytosis
Increased sequestration of platelets	Hypersplenism(cirrhosis, myeloproliferative disorders,lymphoma)
Other conditions causing thrombocytopenia	Gestational thrombocytopenia Bernard Soulier syndrome,gray platelet syndrome, May-Hegglin anomaly Pseudo thrombocytopenia

Treatment

Treat the primary cause. Platelet transfusion is indicated mainly when platelets are not adequately produced and aim is to keep platelet count above $20,000/\text{mm}^3$. If there is no fever and no clinical bleeding, even counts of $10,000/\text{mm}^3$ are acceptable.

Idiopathic thrombocytopenic purpura (ITP)–Test for HCV and HIV, iron deficiency for newly diagnosed patients. Bone marrow examination is not necessary irrespective of age of patients presenting with typical ITP.

Treatment

Tab. Prednisolone 1 mg/kg/day orally for 7-10 days followed by rapid taper.

Or

Dexamethasone 40 mg/day orally for 4 days followed by monthly for 6 months.

+/-

IV Immunoglobulin 1 g /kg/day for 2 days

Or

Inj. Anti-D 75 mcg/kg single dose IV in Rh-positive, non-splenectomised patients.

+/-

Platelet transfusion if there is bleeding.

COAGULATION DISORDERS

There is prolongation of coagulation parameters:

1. Prolonged prothrombin time: In liver failure, vitamin K deficiency, oral anticoagulants, disseminated intravascular coagulation (DIC).
2. Prolonged thrombin time, heparin use, DIC.

Treatment

Treat the underlying cause. If cause is not clear, give vitamin K and fresh frozen plasma (FFP) depending on investigation.

- Inj. Vitamin K intravenous (use IV preparation) 10 mg IV once daily for 3 days or till response.
- Fresh frozen plasma (FFP) contains active clotting factors present in blood. Dose is 15 ml/kg initially, followed by 10 ml/kg every 12 hourly. Factor VIII concentrates are needed for haemophilia A (refer to a specialist).

References

1. Bleeding and Thrombosis. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; 457-464.
2. Evidence based Practice Guidelines for Immune-thrombocytopenia. The American Society of Hematology. Blood 2011; 117: 4190-4207. 2011.
3. Current Medical Diagnosis and Treatment 2015 Pg no.537.
4. Current Medical Diagnosis and Treatment 2015 Pg no.53.

CHAPTER 5

RESPIRATORY DISEASES

PNEUMONIA

Pneumonia is an inflammation in alveolar tissue, most often caused by a microbial agent. Commonly caused by *Streptococcus pneumoniae* (typical) .

Clinical features

- Sudden onset of fever,
- Productive cough,
- Chest pain,
- Shortness of breath and (in some cases) pleuritic chest pain;
- Systemic symptoms -headache, bodyache and delirium
- Atypical pneumonia syndrome - gradual onset, a dry cough, shortness of breath and a prominence of extrapulmonary symptoms (headache, myalgias, fatigue, sore throat, nausea, vomiting and diarrhoea) and abnormalities on chest X-ray despite minimal signs of pulmonary involvement (other than rales).
- Primary atypical pneumonia caused by Mycoplasma - violent, episodic cough with small mucoid sputum preceded by fever with or without chills and may be accompanied by profound weakness.

Investigations

- X-ray chest
- Sputum examination (Gram stain and culture), AFB staining.

Treatment

Nonpharmacological

Adequate fluids, promoting expectoration (gravity drainage, primarily used in bronchiectasis).

Pharmacological

Outpatient Management

1. For previously healthy patients who have not taken antibiotics within the past 3 months:
Azithromycin 500 mg orally first dose followed by 250 mg daily for 4 days or 500 mg daily for 3 days. Or Clarithromycin 500 mg orally twice a day
Or
Doxycycline 100 mg orally twice a day.
2. For patients with co-morbid conditions e.g. chronic heart, lung, liver or renal disease, diabetes, alcoholism, malignancy, asplenia, immunosuppressive state, use of antibiotics within last 3 months

Levofloxacin 750 mg/Moxifloxacin 400 mg/ Gemifloxacin
320 mg orally daily

Or

Azithromycin 500 mg orally first dose followed by 250 mg daily for 4 days or 500 mg daily for 3 days. **Or** Clarithromycin 500 mg orally twice a day + Amoxicillin 1 g orally thrice a day **Or** Amoxicillin-Clavulanate 2 gram orally twice a day **Or** Cefpodoxime 200 mg orally twice a day **Or** Cefuroxime 500 mg orally twice a day.

3. In regions with high rate (>25%) of infection with a high level (MIC \geq 16 mcg/ml) macrolid-resistant *Streptococcus Pneumoniae* consider alternatives mentioned at number 2 in patients with co-morbidities.

Inpatient Management not requiring intensive care

Levofloxacin 750 mg/Moxifloxacin 400 mg/ Gemifloxacin
320 mg orally daily **Or** IV Levofloxacin 750 mg daily/Ciprofloxacin 400 mg 8-12 hourly/Moxifloxacin 400 mg daily.

Or

Azithromycin 500 mg orally first dose followed by 250 mg daily for 4 days or 500 mg daily for 3 days. **Or** Clarithromycin 500 mg orally twice a day + Amoxicillin 1 g orally thrice a day **Or** Amoxicillin-Clavulanate 2 gram orally twice a day **Or** Cefpodoxime 200 mg orally twice a day **Or** Cefuroxime 500 mg orally twice a day.

Or

IV Ampicillin 1-2 g 4-6 hourly **Or** Cefotaxime 1-2 g every 4-12 hrs **Or** Ceftriaxone 1-2 g every 12-24 hrs.

Inpatient Intravenous Management requiring intensive care

1. Azithromycin 500 mg orally first dose followed by 250 mg daily for 4 days or 500 mg daily for 3 days. **Or** Levofloxacin 750 mg/Moxifloxacin 400 mg/ Gemifloxacin 320 mg orally daily **Or** IV Levofloxacin 750 mg daily/Ciprofloxacin 400 mg 8-12 hourly/Moxifloxacin 400 mg daily
+Cefotaxime 1-2 g every 4-12 hrs **Or** Ceftriaxone 1-2 g every 12-24 hrs **Or** IV Ampicillin-sulbactam 1.5-3 g 6 hourly
2. For patients allergic to beta lactam fluoroquinolone + aztreonam 1-2 g every 6-12 hrs.
3. For patients at risk for *Pseudomonas* infection
 - a. Piperacillin-Tazobactam 3.375-4.5 g every 6 hours **Or** Cefepime 1-2 gm twice a day **Or** Imipenem 0.5-1 g every 6-8 hrs **Or** Meropenem 1 g every 8 hrs + Ciprofloxacin 400 mg 8-12 hrly **Or** IV Levofloxacin 750 mg daily.

Or

- b. Piperacillin-Tazobactam 3.375-4.5 g every 6 hours **Or** Cefepime 1-2 gm twice a day **Or** Imipenem 0.5-1 g every 6-8 hrs **Or** Meropenem 1 g every 8 hrs + Aminoglycoside (Gentamicin/amikacin/tobramycin all weigh based dosing administered daily) + Azithromycin/fluoroquinolone.
4. For patients at risk for MRSA infection, add vancomycin or linezolid 600 mg twice a day.

References

1. Pneumonia. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp 2130-2140.
2. Guidelines for the Management of Adult with Community-acquired Pneumonia - American Thoracic Guidelines. Am J Resp and Critical Care Medicine, Vol 16, 2001; pp 1730-1754.
3. IDSA Guidelines. Update of Practice Guidelines for the Management of Community Acquired Pneumonia in Immunocompetent Adults. Clinical Infections Diseases 2003; 37: 1405-1433.
4. IDSA Guidelines. Practice Guidelines for Outpatient Parenteral Antimicrobial Therapy. Clinical Infections Diseases 2004; 38: 1651-1672.
5. Current Medical Diagnosis and Treatment 2015. 53rd edition Pg 267.

CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

COPD is characterized by persistent airflow limitation that is usually progressive and associated with an enhanced chronic inflammatory response in the airways and the lung to noxious particles or gases.

Clinical features

chronic bronchitis - cough/ expectoration for at least 3 months in a year for 2 or more years
emphysema – mostly due to inhalation of smoke, air pollution, infections and genetic.

Diagnosis

- Clinical - dyspnoea, chronic cough or sputum production, and/or history of exposure to risk factors for the disease.
- Spirometry post-bronchodilator $FEV_1/FVC < 0.70$ confirms the presence of persistent airflow obstruction.
- Chest X-ray – hyperinflation.

Treatment

A COPD management programme includes four components: Assess and monitor disease, reduce risk factors, manage stable COPD, manage and prevent exacerbations, actively identification of comorbidities.

The spirometric classification of severity of airflow limitation is divided into four grades based on post-bronchodilator FEV_1 using the fixed ratio $FEV_1/FVC < 0.70$ as GOLD 1 (mild; $FEV_1 \geq 80\%$ predicted), GOLD 2 (moderate; $50\% \leq FEV_1 < 80\%$ predicted), GOLD 3 (severe; $30\% \leq FEV_1 < 50\%$ predicted) and GOLD 4 (very severe; $FEV_1 < 30\%$ predicted).

Nonpharmacological

- Cessation of smoking,
- Avoiding inhalation of smoke from other sources (home or occupational), c

Pharmacological

A. Severe acute bronchospasm

1. Oxygen inhalation (24-28%) with the venturi mask or through nasal prongs at flow rate of

- 1-2 liters/min.
2. Salbutamol solution 2.5 mg inhaled using nebulization 4-6 times a day and as and when required.
3. Inj. Aminophylline 250-500 mg (5 mg/kg) dissolved in 20 ml of 5% dextrose given slowly over 20 minutes (not given if patient already receiving theophylline) or has liver disease followed by infusion at the rate of 0.5 mg/kg/h.
4. Oral/parenteral Amoxycillin 500 mg+ Clavulanic acid 125 mg 3 times a day for 7-10 days.
5. Tab Prednisolone 1-2 mg/kg/day for 5 days.

Refer the patient to hospital for further treatment/assisted ventilation if no response to above treatment, severe cyanosis and/or altered sensorium.

B. Maintenance treatment

1. Salbutamol-metered dose inhaler (MDI) inhalation 200 mcg 4 times a day and as and when required (use spacer, if coordination is a problem for the patient).

Or

Terbutaline metered dose inhaler 250 mcg 4 times a day and as and when required.

2. If no complete response to the above, give Ipratropium bromide inhalation 200 mcg 2 times a day.
3. Tab. Theophylline 100-200 mg 3 times a day given after meals.
4. If patient is expectorating yellowish sputum, oral Amoxycillin 500 mg+ Clavulanic acid 125 mg 3 times a day for 7-10 days.
5. Steroids have a very limited role in selected patients only, if at all required should be administered by the specialist only.

Indication about home therapy of oxygen to be decided by the specialist and if indicated, should be taken for 15 hours a day.

Use of mucolytics has no proven benefit. Regular use of antitussives is contraindicated in stable COPD. Respiratory stimulants are not recommended.

References

1. Chronic Obstructive Pulmonary Disease (COPD). In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp. 2151-2160.
2. Global Strategy for Diagnosis, Management and Prevention of COPD. The Global Initiative for Chronic Obstructive Lung Diseases (GOLD). Updated Oct. 2011.

BRONCHIECTASIS

Bronchiectasis may be initiated by primary microbial infection (necrotizing pneumonia, tuberculosis, aspergillosis, etc.) or obstruction (foreign body, tumour, lymph node, etc.) resulting in stasis and secondary infection.

Clinical features

- Insidious onset with chronic productive cough,

- Increasing volume of sputum due to recurrent infections,
- Haemoptysis,
- Clubbing of fingers,
- Terminating in cor pulmonale and respiratory failure.

Treatment

Nonpharmacological

- Stop smoking;
- Physiotherapy in the form of chest percussion and gravity drainage to remove secretion;
- Graded exercise with routine deep breathing exercises
- Maintenance of good nutrition.

Pharmacological

Aim is to take care of complicating infections (as indicated by purulent sputum, may be associated with blood) and management of associated bronchospasm, if present.

1. Cap Amoxicillin 50 mg/kg in 3 divided doses.

Or

Cap Amoxicillin 500 mg+ Clavulanic acid 125 mg 3 times a day.

Or

Cap Tetracycline 25-50 mg/kg/day in 3 divided doses.

Or

Tab. Cotrimoxazole (SMZ 800 mg + TMP 160 mg) 2 times a day.

The antibiotic choice is modified by Gram stain and sputum culture and is given for 7-10 days.

If *Staph aureus* suspected or isolated, then consider Cap Ampicillin + Cloxacillin 1 g 6 hourly.

Or

Inj. Nafcillin or Oxacillin 2 g 4 hourly.

If *Pseudomonas* isolated, use at least 2 effective antipseudomonal drugs Inj. Ceftazidime 1-2 g IV 8 hourly + Inj Gentamicin 3-5 mg/kg/day.

2. Salbutamol inhaler 200 mcg four times a day and SOS.
3. Tab. Etophylline + Theophylline 100-200 mg 3 times a day.

Hospitalization is required for severe bronchospasm, a very sick patient or significant haemoptysis.

Surgery is indicated in case of uncontrolled haemoptysis and if the disease is localized to one lobe/lobule. Emergency surgical resection may be necessary for life-threatening haemoptysis but embolization of appropriate bronchial artery is usually attempted first.

Reference

1. Bronchiectasis and Lung Disease. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp. 2142-2146.

COR PULMONALE

Right ventricular dilatation and/or hypertrophy associated with pulmonary hypertension (PHT) secondary to disease of thoracic wall, pleura or pulmonary parenchyma.

Clinical Features

Same as congestive heart failure.

Diagnosis

- Clinical findings,
- Chest x-ray,
- Pulmonary function tests (pfts),
- Ecg,
- Echocardiography.

Treatment

1. Treat the underlying cause.
2. Salt reduced diet
3. Diaphragmatic breathing
4. Breathing exercises
5. Long term oxygen therapy Stop smoking
6. Prompt treatment of acute respiratory infections.
7. Same as congestive heart failure (for details see respective section).

Surgical

Phlebotomy when haematocrit > 50-60%.

Reference

1. Heart Failure and Cor Pulmonale. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp. 1901-1915.

PLEURAL EFFUSION

A pleural effusion is an abnormal amount of fluid in the pleural cavity bounded by visceral and parietal pleura . Pleural effusions can result from many medical conditions.

Clinical Features

- Breathlessness,
- Dry, non-productive cough,
- Fever and
- Pleuritic chest pain.
- Decreased or absent breath sounds,

- Dullness on percussion stony dull,
- Decreased vocal resonance.

Investigations

- Elevated white cell count and/or C reactive protein (CRP),
- Blood culture
- Chest X-ray
- Thoracentesis (20 to 50 ml of pleural fluid).
- **Transudate:** Congestive cardiac failure, cirrhosis of liver, nephrotic syndrome, myxoedema, peritoneal dialysis, hypoproteinaemia, atelectasis
- **Exudates:** Infectious diseases – tuberculosis, other bacterial, viral, fungal, parasitic; malignant diseases – bronchogenic carcinoma; metastatic disease – mesothelioma, lymphomas, pulmonary embolism, rheumatoid arthritis, systemic lupus erythematosus; gastrointestinal disease – oesophageal perforation; pancreatic disease – amoebic liver abscess, uraemia, chylothorax, hemothorax, traumatic; drug-induced – nitrofurantoin, dantrolene, amiodarone, methotrexate etc.
- In tubercular pleural effusion: Pleural fluid is straw-coloured effusion with lymphocyte predominance, protein > 3 g/dl (exudative), ADA level > 50 U/l.
- Ultrasound chest
- Percutaneous pleural biopsy,

Treatment

Treatment is based on the underlying condition (tuberculosis/heart failure/nephritic syndrome/liver cirrhosis) (See respective section for details).

For large pleural effusion causing breathlessness, perform therapeutic thoracentesis. Stop the procedure, if patient develops cough or chest pain. (**Caution:** Pain, pneumothorax, haemorrhage, and subcutaneous emphysema (do check X-ray after procedure).

For para pneumonic effusion

1. Penicillins, penicillins combined with β -lactamase inhibitors, metronidazole and cephalosporins penetrate the pleural space well.
2. Urgent drainage of para pneumonic effusions, if frankly purulent fluid, a pleural fluid pH of less than 7.2, loculated effusions, and bacteria on Gram stain or culture. chest tube should be removed when pleural fluid drainage is less than 50 ml for 24 hours and draining fluid becomes clear yellow.
3. In case patient does not demonstrate clinical or radiologic improvement with declining pleural fluid drainage, perform a pleural space ultrasound examination or chest CT scanning to look for pleural fluid loculations and ensure proper tube placement.

Reference

1. Helen E Davies, 1,2 Robert JO Davies, 1 Christopher WH Davies, 2 on behalf of the BTS Pleural Disease Guideline Group. Management of pleural infection in adults: British Thoracic Society pleural disease guideline 2010. Thorax 2010; 65 (Suppl 2): ii41eii53. doi:10.1136/thx.2010.137000.

2. Diagnosis and Management of Parapneumonic Effusions and Empyema. Clinical Infectious Diseases 2007; 45 (11): 1480-1486.

PNEUMOTHORAX

Pneumothorax is presence of air in the pleural cavity.

Clinical Features

- Sudden onset of chest pain and/or shortness of breath. Pain begins suddenly and is worsened by breathing deeply or coughing.
- On examination, hyper-resonant percussion note and absent or reduced breath sounds.

Investigations

Chest X-ray- air collected around the outside surface of the lung.

Treatment

- Small spontaneous pneumothorax who have no significant underlying lung disease, resolve without treatment and require only monitoring.
- Tension pneumothorax / larger pneumothorax, or when there are marked symptoms, urgent needle decompression followed by a chest tube connected to a one-way valve system is required. The needle or cannula is left in place until a chest tube can be inserted.
- Pleurodesis or pleurectomy - when tube drainage is unsuccessful, or as a preventive measure, in case of repeated episodes.

Reference

1. Management of spontaneous pneumothorax: British Thoracic Society Pleural Disease Guideline 2010.

BIRD FLU AND SWINE FLU

Influenza-like illness caused by *Influenza A* (H1N1).

Clinical Features

- Fever
- Cough, running nose and sore throat.
- Headache, bodyache, fatigue
- Diarrhoea and vomiting

Investigations

- Routine haematological, biochemical, radiological and microbiological tests
- RT PCR or isolation of the virus in culture or four-fold rise in virus specific neutralizing antibodies at designated centres.

Treatment

The guiding principles of treatment are:

1. Early implementation of infection control precautions to minimize nosocomial/ household

spread of disease. Voluntary home quarantine for close contacts of suspected, probable and confirmed cases for at least 7 days after the last contact with the case.

2. Prompt treatment to prevent severe illness & death.
3. Screening of all individuals seeking consultations for flu like symptoms, examination by a doctor for early identification and follow up of persons at risk. Notify all suspected cases, clusters of ILI/SARI cases to the State Health Authorities and the Ministry of Health & Family Welfare, Govt. of India.
4. Follow guidelines on categorization of *Influenza A* H1N1 cases during screening for home isolation, testing treatment, and hospitalization.

Category-A

Patients with mild fever plus cough/sore throat with or without bodyache, headache, diarrhoea and vomiting do not require Oseltamivir and give symptomatic treatment. Monitor and reassessment by the doctor at 24 to 48 hours. No testing of the patient for H1N1 is required.

Confine patients to their home and to avoid mixing up with public and high-risk members in the family.

Category-B

- i. In addition to all the signs and symptoms mentioned under Category-A, if the patient has high grade fever and severe sore throat, may require home isolation on Oseltamivir.
- ii. In addition to all the signs and symptoms mentioned under Category-A, individuals having one or more of the following high-risk conditions shall be treated with Oseltamivir:

Children with mild illness but with predisposing risk factors; pregnant women; persons aged 65 years or older; patients with lung diseases, heart disease, liver disease, kidney disease, blood disorders, diabetes, neurological disorders, cancer and HIV/AIDS; patients on long-term cortisone therapy.

No tests for H1N1 are required for Category-B (i) and (ii).

Confine all patients of Category-B (i) and (ii) at home and to avoid mixing with public and high-risk members in the family.

Category-C

In addition to the above signs and symptoms of Category-A and B, if the patient has one or more of the following:

- Breathlessness, chest pain, drowsiness, fall in blood pressure, sputum mixed with blood, bluish discolouration of nails.
- Children with influenza-like illness who had a severe disease as manifested by the red flag signs (Somnolence, high and persistent fever, inability to feed well, convulsions, shortness of breath, difficulty in breathing, etc).
- Worsening of underlying chronic conditions.
- All patients in Category-C require testing, immediate hospitalization and treatment as follows:
- Clinical specimens: Nasopharyngeal swab, throat swab, nasal swab, wash or aspirate, and tracheal aspirate (for intubated patients) to be collected by a trained physician/microbiologist preferably before administration of the antiviral drug. Specimens should be stored at 4°C in viral transport media and transport samples to designated laboratories

within 24 hours. If there is delay in transportation, store samples at -70°C . Also collect paired blood samples at an interval of 14 days for serological testing.

Nonpharmacological

1. Patient should be kept in dedicated isolation room and treated by dedicated doctors, nurses and paramedical workers. If dedicated isolation room is not available, then patients can be cohorted in a well-ventilated isolation ward with beds kept one meter apart.
2. Reinforce standard infection control precautions, i.e. all those entering the room must use high efficiency masks, gowns, goggles, gloves, cap and shoe cover.
3. Restrict number of visitors and use personal protective equipment (PPE).
4. Dispose waste properly by placing it in sealed impermeable bags labelled as bio-hazard.

Pharmacological

1. Tab. Oseltamivir or Syp. (12 mg per ml) both for prophylaxis and treatment. Dose and duration to be modified as per clinical condition, if needed.

Weight	Dose	Age	Dose
<15 kg	30 mg twice a day for 5 days	<3 months*	12 mg twice a day for 5 days
15-25 kg	45 mg twice a day for 5 days	3-5 months	20 mg twice a day for 5 days
24-<40 kg	60 mg twice a day for 5 days	6-11 months	25 mg twice a day for 5 days
>40 kg	75 mg twice a day for 5 days	* Chemoprophylaxis not recommended unless situation judged critical due to limited data on use in this age group.	

(**Caution:** Dose dependent (usually above 300 mg/day) transient gastrointestinal side effects (nausea, vomiting); bronchitis, insomnia and vertigo and sporadic transient neuropsychiatric events (self-injury or delirium).

2. Give supportive therapy for fever and upper respiratory symptoms (for details see respective sections).

Note: Salicylate/aspirin is strictly contraindicated in any influenza patient due to its potential to cause Reye's syndrome.

3. Monitor suspected cases for clinical/radiological evidence of lower respiratory tract infection and for hypoxia (respiratory rate, oxygen saturation, level of consciousness). Suspected cases not having pneumonia do not require antibiotic therapy. For treatment of pneumonia, see section on Pneumonia in Chapter 5.
4. Maintain airway, breathing and circulation (ABC) (see, section on CPR in Chapter 2).
5. In patients with signs of tachypnoea, dyspnoea, respiratory distress and oxygen saturation less than 90% supplement with oxygen therapy.

Mechanical ventilation for patients with severe pneumonia and acute respiratory failure ($\text{SpO}_2 < 90\%$ and $\text{PaO}_2 < 60 \text{ mmHg}$ with oxygen therapy). Non-invasive ventilation when mechanical ventilation is not available. Use HEPA filters on expiratory ports of the ventilator circuit/high flow oxygen masks. Administer prophylactic antibiotics to patients

on mechanical ventilation.

6. For treatment of shock, see section on Shock in Chapter 1.
7. Maintain hydration, electrolyte balance and nutrition (See respective section for details).

Expect complications to be similar to seasonal influenza and treat accordingly.

Immunomodulating drugs and high dose corticosteroids (potential for harm) are not beneficial in treatment of ARDS or sepsis associated multi-organ failure. Low dose corticosteroids (hydrocortisone 200-400 mg/day) may be useful in persisting septic shock (SBP < 90 mmHg).

Adult and children to be discharged 7 and 14 days after symptoms have subsided, respectively. The family of patients discharged earlier should be educated on personal hygiene and infection control measures at home; children should not attend school during this period.

Administer chemoprophylaxis to all close contacts of suspected, probable and confirmed cases including health care personnel. Close contacts include household/ social contact, family members, workplace or school contact, fellow travellers, etc. Provide prophylaxis till 10 days after last exposure (maximum period of 6 weeks).

References

1. Swine Flu. Clinical management Protocol and Infection Control Guidelines. Directorate General of Health Services . Ministry of Health and Family Welfare. Government of India. <http://mohfw-h1n1.nic.in/> accessed on February 4, 2013.
2. Government of India Guidelines for H1N1 Influenza cases. <http://www.scribd.com/doc/18658440/Govt-of-India-Guidelines-for-H1N1-Influenza-Cases> accessed on February 4, 2013.
3. Guidelines for Management of suspected Swine Flue (H1N1 Viral). IAP Guidelines.
4. Seasonal Influenza. Center for Disease Control and Prevention. <http://www.cdc.gov/flu/professionals/antivirals/index.htm> accessed on February 4, 2013.

CHAPTER 6

GASTROINTESTINAL DISEASES

RECURRENT ORAL APHTHOUS ULCERS

Single or multiple 1-15 mm size painful ulcers surrounded by erythematous mucosa occurring repeatedly anywhere in the oral mucosa (lip, tongue, soft palate or oropharynx). Usually heal in 1-2 weeks.

Treatment

Rule out secondary causes like malabsorption syndrome, inflammatory bowel disease, Behcet's disease and recurrent trauma from tooth/denture and treat accordingly.

Nonpharmacological

Oral hygiene—repeated mouth wash with plain water specially after eating anything (for details see section on Oral Hygiene in Chapter 20) and avoid constipation.

Pharmacological

Treatment is challenging because no single systemic treatment has been proven effective.

1. Topical corticosteroid – Triamcinolone acetonide 0.1% Or Fluocinonide ointment 0.05% in an adhesive base provides symptomatic relief.
2. Only in severe cases with large multiple ulcers (>1 cm) :

A one week tapering course of Tab Prednisolone 40-60 mg/day has been used successfully.

Reference

1. Oral Manifestation of Disease. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp. 267-276.
2. Current Medical Diagnosis and treatment 2015 Pg 226.

ACUTE OROPHARYNGO-OESOPHAGEAL CANDIDIASIS

Commonly occurs as opportunistic infection in individuals with uncontrolled diabetes mellitus or immunosuppressed conditions (AIDS, malignancy, chronic steroid therapy, cytotoxic drugs). Usually caused by *Candida albicans*.

Clinical features

- Discrete or confluent curdy white adherent plaques on the oropharyngeal/ oesophageal mucosa.
- Oesophageal involvement produces painful dysphagia.

Diagnosis -by demonstration of pseudohyphae on wet smears or culture.

Treatment

Soln. Clotrimazole 1% to be applied locally for 5-7 days.

Or

Susp. Nystatin local application in mouth and 100,000 units orally 4 hourly for 5-7 days.

Or

Tab. Ketoconazole 200 mg once a day for 7-14 days with breakfast.

Or

Tab. Fluconazole 100 mg/day for 7 days.

Reference

1. Candidiasis. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp. 1651-1655.
2. Current Medical Diagnosis and Treatment 2015. Pg 225.

DYSPEPSIA

A syndrome of chronic or recurrent abdominal pain or discomfort in the upper abdomen. May be organic, due to acid-peptic disorders, upper GI malignancy or functional.

Treatment

Nonpharmacological

- Avoid excess tea, coffee, alcohol, smoking, high-fat meals; specific food if any.
- Eating frequent and smaller meals throughout the day can sometimes be helpful.

Pharmacological

Indications for prompt oesophagogastrroduodenoscopy (EGD)

- Dyspeptic patients over 55 years of age
- Unexplained weight loss (>10% body weight),
- Anorexia, early satiety,
- Vomiting,
- Progressive dysphagia, odynophagia,
- Bleeding, anaemia,
- Jaundice,
- An abdominal mass, family history of upper gastrointestinal tract cancer
- Lymphadenopathy
- History of peptic ulcer,
- Previous gastric surgery or malignancy.

Medication is not necessary for all patients with functional dyspepsia. When medication is given, short-term treatment, intermittent therapy, if necessary, is likely to be more appropriate than long-term continuous therapy.

Test and treat for *Helicobacter pylori* (*H. pylori*) in populations with a moderate to high prevalence of *H. pylori* infection using a validated noninvasive test and a trial of acid suppression, if eradication is successful but symptoms do not resolve. *H. pylori* treat infection with triple regimen (see section on Peptic Ulcer). Assess for clinical response after 4 weeks of the treatment.

Or

In low prevalence situations, Cap. Omeprazole 20 mg once daily 30 minutes before breakfast for 4-6 weeks. If initial acid suppression fails after 2-4 weeks, consider changing drug or dose.

If the patient fails to respond or relapses rapidly on stopping antisecretory therapy, then the test-and-treat for *H. pylori* before consideration of referral for EGD.

Prokinetic agents (Domperidone or mosapride) are not recommended as first-line therapy for uninvestigated dyspepsia. There is no evidence on the efficacy of antacids in the management of functional dyspepsia.

References

1. Management of functional Dyspepsia. Scottish Intercollegiate Guidelines Network (SIGN) Guidelines 2012.
2. Nausea, Vomiting and Indigestion. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp. 301-307.
3. Guidelines for the Management of Dyspepsia. American Journal of Gastroenterology. Am J Gastroenterol 2005;100:2324–2337.

GASTRO-OESOPHAGEAL REFLUX DISEASE

A common disorder caused by retrograde flow of gastric contents through an incompetent gastro-oesophageal junction.

Clinical features

- Retrosternal pain, heart burn and regurgitation mostly occurring after meals; rarely may present with chronic cough, laryngitis; recurrent pulmonary infections especially in children and bronchospasm.
- Disease is classified as mild, if endoscopy reveals no or minimal oesophageal mucosal inflammation and moderate-to-severe, if there are ulcers with or without stricture formation in distal oesophagus.

Diagnosis

- History,
- Upper gi endoscopy.
- 24-h ph monitoring required in difficult cases.

Treatment

Nonpharmacological

- Weight reduction if obese, elimination of fatty foods, avoiding alcohol, and smoking, excessive consumption of tea/coffee,
- Elevation of head-end of the bed,
- Taking early dinner (2-3 hours before sleep).
- Patients with postprandial symptoms are advised to take small frequent meals.

Pharmacological

Mild gastro-oesophageal reflux

For immediate symptomatic relief, Antacid gel (with or without alginate) 10-15 ml or 2-3 tablets (chewed) taken 4-6 times a day ½ to 1 hour after meals; may be given for a long time depending upon patients symptoms. If no relief, add (1) and/or (2) as below.

Specific therapy

1. Tab. Domperidone 10 mg 3 times a day 30 minutes before meals for 4-6 weeks or even for
(142)

longer, if needed.

Or

Tab. Mosapride 5 mg 3 times a day 30 minutes before meals for 4-6 weeks or longer, if needed.

2. Tab Omeprazole 20 mg once daily 30 minutes before meals for 4-6 weeks.

Follow-up. Omeprazole courses may be repeated or continued for several months, if patient relapses while on antacids or Domperidone/Mosapride.

Moderate-to-severe gastro-oesophageal reflux disease (endoscopically proved erosive oesophagitis)

1. Cap. Omeprazole 20 mg twice daily 30 minutes before meals for 4 weeks, followed by further 4-8 weeks, if not fully healed.

Or

Cap. Lansoprazole 30 mg 2 times a day 30 minutes before meals for 3 months.

Or

Tab. Pantoprazole 40 mg 2 times a day 30 minutes before meals for 3 months.

Follow-up. Repeat endoscopy after 3 months to confirm healing of oesophagitis. If healed, continue maintenance treatment as in mild reflux disease or single daily dose of 10-20 mg Omeprazole (or any other PPIs). Refer to the specialist, if no or inadequate response

References

1. Management of GERD in Adults. In: Approach to Patients with Chronic Gastrointestinal Disorder'. Corazziari E. (ed), Messaggi Milano SRL, Itali, 1999; pp. 255-69.
2. Oesophageal symptoms and Motility Disorders. In: Medicine International. Jewell DP, Thillainayagam (eds), The Medicine Publishing Co. Oxford, UK 1998; pp. 1-6.
3. Nausea, Vomiting and Indigestion. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp.301-307.
4. Disease of the Oesophagus. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp 2427-2437.
5. Gastro-oesophageal reflux disease. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp 2433-2435

PEPTIC ULCER

Acid-pepsin-related ulceration of mucosa of stomach and duodenum.

Clinical features

- Sharp or gnawing epigastric pain, may be worsened (gastric ulcer) or relieved by intake of food (in duodenal ulcer). Nocturnal pain commonly awakens the patient at midnight but early morning pain is very rare. Symptoms are recurrent and periodic.
- Complications include upper GI bleed, perforation and gastric outlet obstruction. 95% of duodenal ulcers and 60% of gastric ulcers are related to *H. pylori* infection and remaining related to NSAID intake.

Diagnosis

- Upper GI endoscopy.
- *H. Pylori* infection may be diagnosed by serology, rapid urease test, histopathology of

antral mucosa or C13 breath test.

Treatment

Nonpharmacological

Stop smoking and avoid/minimize intake of NSAIDs or switch over to a safer NSAID.

Pharmacological

Symptomatic treatment

Cap. Omeprazole 20 mg single dose 30 minutes before breakfast for 6 weeks.

Or

Antacid gel 10-15 ml or 2-3 tablets (chewed) taken 4-6 times a day ½ to 1 hour after meals.

It is recommended that the presence of *H. pylori* is confirmed before starting eradication treatment.

Preferred one week triple therapy for eradication of *H. pylori* regimen

1. Tab. Omeprazole 20 mg 2 times a day.
2. Tab. Clarithromycin 500 mg 2 times a day.
3. Cap. Amoxicillin 1 g 3 times a day.

All medicines to be taken 15-30 minutes before meals.

Alternative regimen. Replace Tab. Clarithromycin with Tab. Metronidazole 400mg 3 times a day or Tab. Tinidazole 600 mg 2 times a day given after meals.

Concurrent use of proton pump inhibitors (PPI) and ranitidine is not recommended due to the potential decrease in the PPI effectiveness. In cases of ulcers refractory to Ranitidine, PPI is recommended.

Refractory and recurrent ulcers include ineffective eradication therapy, unidentified use of NSAID and poor compliance with medications regimens, incomplete healing of large ulcers, Zollinger-Ellison syndrome and malignant neoplasms.

In NSAID induced ulcers, discontinue NSAIDs or switch to NSAID with less gastric side effects, take NSAIDs after meals. If NSAID cannot be discontinued, give tab. Ranitidine 150 mg twice a day for 8 weeks.

References

1. Peptic Ulcer Disease and Related Disorders. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp. 2438-2460.
2. Protocol for Diagnosis and Treatment of Peptic Ulcer. American International Health Alliance (AIHA). <http://www.aiha.com> accessed on 20.9.12.

VOMITING

Forceful expulsion of the gastric contents due to involuntary contraction of abdominal musculature and simultaneous relaxation of gastric fundus and lower oesophageal sphincter.

Causes of vomiting

- (a) Central (due to stimulation of vomiting centre)—neurological diseases, raised intracranial pressure, vestibular system disorders, drugs and toxins, any acute

severe pain, toxic or metabolic disorders like ketoacidosis, systemic infections, radiation exposure, pregnancy and psychogenic vomiting.

- (b) Peripheral—obstructive lesion of GIT, acute gastritis or gastroenteritis, severe upper GI bleed, etc.

Excessive vomiting causes loss of salt and water and exhaustion while chronic recurrent vomiting prevents eating and causes starvation. Severe nausea and retching may result in upper GI bleed by causing Mallory-Weiss Tear in oesophagus/cardia of stomach.

A detailed history and clinical examination usually gives a clue to the cause of acute vomiting. For chronic and recurrent vomiting, investigation should be done to exclude a local cause in the GIT, evidence of raised intracranial tension (ICT) or presence of any other neurological condition. Psychogenic vomiting is diagnosed by exclusion of organic causes only.

Treatment

Nonpharmacological

- Advise the patient to take sips of cold water/ORS.
- Prevent motion sickness by avoiding heavy meal before travel.

Pharmacological

Treat the underlying cause (medically or surgically).

Hospitalize the patient to give IV fluids, if dehydrated. Start oral fluids as soon as patient can tolerate. Appropriate analgesics, if patient has severe pain.

For symptomatic relief:

In acute vomiting in the absence of obstruction to GIT or other organic cause, give
Inj. Metoclopramide 10 mg IV and repeat after 6 hours, if needed.

Or

Inj. Prochlorperazine 5 mg IM, repeated after 4-6 hours, if needed.

In patients with recurrent vomiting due to gastroparesis (as in diabetes), non-ulcer dyspepsia, give:
Tab. Mosapride 5 mg 3 times a day.

Or

Tab. Domperidone 10 mg 3 times a day.

Or

Tab. Metoclopramide 10 mg 3 times a day.

To prevent motion sickness, give:

Tab. Cyclizine 50 mg up to 3 times daily. In children: 6-12 years 25 mg up to 3 times daily to be taken half an hour before starting journey.

Note: In case of vomiting with cytotoxic chemotherapy for cancer patients.

Tab./Inj. Ondansetron 8 mg 12 hourly. In pregnancy, avoid all drugs, if possible. See section on Nausea and Vomiting in Chapter 15.

Reference

1. Nausea, Vomiting and Indigestion. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp. 301-307.

CONSTIPATION

Constipation is decrease in frequency and liquidity of stool compared to the normal pattern in a particular individual.

Causes - habitual, following an attack of diarrhoea after taking a purgative; neurological, hormonal, colonic, malignancy, depression.

Clinical Features

- Straining at defaecation >25% of time,
- Lumpy/hard stools,
- Sensation of incomplete evacuation,
- Less than 3 bowel actions per week.

Treatment

Nonpharmacological

1. Reassurance—since many patients with normal stools and in pregnancy, imagine that they are constipated.
2. High fibre diet and increased intake of fluid with decrease in consumption of caffeinated drinks.
3. Retraining of bowels (avoiding suppression of urge to defaecate, making a regular habit).
4. Bulk forming agents like 'isapghula husk' or 'psyllium seeds' also help to relieve mild constipation.
5. Regular physical exercise such as walk for 1/2 to 1 hour daily and abdominal exercises.

Pharmacological

(Usually required for moderate to severe constipation).

1. Tab Bisacodyl 5-15 mg (1 to 3 tablets) orally once a day, or 10 mg (1 suppository) rectally once a day as needed.

Or

Lactulose Solution 15-20 ml orally at night.

Or

Liquid paraffin 15-20 ml twice or thrice daily.

Or

Susp Magnesium sulphate 15-20 ml at night.

Or

Tab. Sodium picosulphate 10 mg at night.

Or

Isotonic polyethylene glycol (PEG) electrolyte solution 125-250 ml.

Any of these may be given 2-4 times a week. Some patients may require treatment for several weeks or months, if there is no improvement.

2. Tab. Mosapride 5 mg 2 or 3 times a day. In some patients may be required for several

weeks.

3. Phosphate enemas to be used on as and when required basis in patients having acute problem with severe constipation or sub-acute intestinal obstruction.

References

1. Diarrhoea and Constipation. In: In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp 308-319.
2. Medicine International. Jewell DP, Thillainayagam A (eds). The Medicine Publishing Co. Oxford, UK.

(For constipation in children see Chapter-19).

IRRITABLE BOWEL SYNDROME (IBS)

A group of gastrointestinal symptoms associated with lower bowel that occurs in the absence of organic disease.

Clinical Features

- A positive diagnosis of IBS is made using Rome II criteria: At least 3 months continuous or recurrent symptoms of abdominal pain associated with any 2 of the three features, viz. relief by defaecation and/or onset with change in stool frequency or consistency.
- The supportive symptoms of IBS include passage of mucous, abnormal stool passage (straining, urgency of feeling of incomplete evacuation) and feeling of abdominal fullness. There should be no alarm symptoms like fever, weight loss, bleeding per rectum or anaemia.

Diagnosis- Sigmoidoscopy, colonoscopy, proctoscopy are done to rule out other causes.

Treatment

Nonpharmacological

Diet should contain high fibre and supplemented with bulk forming agents like ispaghula husk; avoid caffeine and alcohol; assess for lactose intolerance; avoid any other dietary constituent which worsens the symptoms. Hypnotherapy and modified form of psychotherapy may reduce symptoms.

Pharmacological

1. Tab. Mebavarine hydrochloride 270 mg 3 times a day given for long-term
Or
Tab. Dicyclomine 10 mg 3 times a day
Or
Tab. Drotavarine 40-80 mg 3 times a day
Or
Tab. Propanthaline hydrochloride 15 mg 3 times a day
2. In individuals complaining of symptoms suggestive of depression Tab. Amitriptyline 25 mg at bedtime or 2 times a day
3. In case of severe diarrhoea, if symptoms are not controlled by above drugs, give Tab./Cap. Loperamide hydrochloride 2-4 mg daily for several days/weeks depending upon the clinical response.

References

1. Irritable Bowel Syndrome. In: Medicine International. Jewell DP, Thillainaygam A. (eds), Vol. 22, The Medicine Publishing Co. Oxford, UK, 1998; pp 102-104
2. Clinical Approach to Irritable Bowel Syndrome. In: Approach to Patient with Chronic GI Disorders, 1999; pp 323-29.
3. Irritable Bowel Syndrome. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp 2496-2501.

ACUTE DIARRHOEA/ GASTROENTERITIS

It is a self-limiting illness characterized by diarrhoea, abdominal cramps, nausea and vomiting, usually caused by viruses or bacteria (*E. coli*, *V. cholerae*, *Staph. aureus*, *Bacillus cereus*, etc). May be associated with systemic symptoms like fever, malaise, etc. These patients are more likely to have invasive diarrhoea caused by the bacteria (*E.coli*, *Shigella*, *Salmonella*, *Campylobacter*, etc.) or parasite (*Amoeba*).

Persistent diarrhea is defined as an episode that lasts longer than 14 days. The causes and treatment of persistent diarrhea are different from acute diarrhea; so, it should be investigated and treated as per the cause and dietary modifications like low lactose, no lactose or mono-saccharide diet.

Treatment

Nonpharmacological

- Adequate fluid replacement - juices, soups and glucose/electrolyte drinks (oral rehydration solution)
- Patient should be asked to take only sips of fluid.
(For details of management of moderate to severe dehydration and electrolyte imbalance see section in Chapters 2 and 19).

Pharmacological

1. **Indicated only in very ill patients with systemic symptoms** associated with bloody diarrhoea, traveller's diarrhoea or in cholera infection
Tab. Ciprofloxacin 500 mg 2 times a day for 3-5 days.
2. **In amoebic dysentery**
Tab. Metronidazole 800 mg 3 times a day for 7 days.
Or
Tab. Tinidazole 2 g orally as single dose with food.

In acute *Giardia* infection

Tab. Tinidazole 2 g orally as single dose with food
Or
Tab. Metronidazole 400 mg 3 times a day for 3 days.

Indications for hospitalization

Patients with clinical signs of dehydration especially young children or elderly, suspected cholera, immunosuppressed patients and those with severe systemic symptoms.

References

1. Gastroenteritis. In: Management of Common GI Problems. R Guan, J Kang and H Ng (eds), Medimedia Asia Pvt Ltd., Singapore, 1995; pp. 68-75.
2. Diarrhoea and Constipation. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp. 308-319.

CHRONIC DIARRHOEA

A patient is diagnosed as having chronic diarrhoea, if patient continues to have diarrhoea for more than 2 weeks.

Clinical Features

- Small bowel diarrhoea - bulky, greasy, frothy, foul smelling stools associated with lot of flatulence indicating malabsorption.
- Large bowel diarrhoea - loose/watery stools mixed with mucous and/or blood—commonly caused by irritable bowel syndrome

Investigations

- Tests for malabsorption - faecal fat excretion study, D-xylose absorption, small bowel contrast studies and mucosal biopsy, structural and functional evaluation of pancreas.
- For ulcerative colitis - colonic endoscopy and mucosal biopsy.

Treatment (to be treated by a specialist)

Can be planned only after a proper diagnosis is made. Use of anticholinergics or nonspecific anti-diarrhoeal agents should be discouraged in the absence of proper diagnosis. Treatment of tropical sprue is discussed as under:

Tropical sprue diagnosis suggested by clinical history, small bowel barium study (mucosal oedema, flocculation and clumping of barium), jejunal mucosal biopsy (reveals varying degree of mucosal atrophy).

Nonpharmacological

Plenty of oral fluids. Avoid fatty food and dairy products and take otherwise a balanced diet.

Pharmacological

Treat the underlying cause. If underlying cause is infection, give trial of antibiotics as follows:

1. Tab. Norfloxacin 400 mg 2 times a day.
Or
Tab. Ciprofloxacin 500 mg 2 times a day.
Or
Cap. Doxycycline 100 mg 2 times a day.
Or
If the above mentioned drugs are contraindicated, Tab. Cotrimoxazole 960 mg 2 times a day.
2. Tab. Folic acid 5 mg 2 times a day for 3-6 months duration depending upon patient's response. Other minor nutrient supplements are given, if there is evidence of specific

deficiency.

3. For anaerobic infections, Tab. Tinidazole 2 g orally as single dose with food.

Reference

1. Disorders of Absorption. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp. 2460-2476.

ULCERATIVE COLITIS

The disease almost always involves rectum and rest of the colon may be involved to variable length.

Clinical features

- Bloody diarrhoea,
- Systemic symptoms of low to moderate fever, backache, arthralgias.
- Acute disease is graded as mild (2-4 stool/day), moderate (4-6 stools/day) or severe (>6 stools/day).
- During remission, patient may be asymptomatic or may have extraintestinal symptoms

Diagnosis is confirmed by sigmoidoscopic examination and mucosal biopsies.

Treatment

Aim of the treatment is induction of remission in acute stage and then maintenance of remission.

Nonpharmacological

There is no specific dietary restriction but patient may avoid any food, if the patient is uncomfortable.

Pharmacological

A. *Mild to moderate acute ulcerative colitis (distal/left colonic involvement)*

1. Tab. Sulphasalazine 1 g 3-4 times a day.
Or
Tab. Mesalazine 800 mg 3-4 times a day.
Or
Tab. Olsalazine 1-3 g/day in divided doses.
2. Prednisolone phosphate enema, 20 mg in 100 ml saline 1-2 time a day.
Or
Hydrocortisone enema 100-125 mg in 100 ml saline 1-2 times a day (to be prepared fresh).
Or
If disease limited to rectum, Hydrocortisone foam 125 mg 1-2 times a day.

B. *Moderate to severe or extensive acute disease*

1. Start (1) as above.
2. Tab. Prednisolone 20-60 mg/day in single or divided doses.

Follow-up. If the symptoms do not improve or worsen, hospitalize the patient.

C. Acute severe disease with systemic symptoms (requires hospitalization under the care of specialist)

1. Inj. Hydrocortisone 100 mg IV 4 times a day.
Or
Inj. Dexamethasone 4 mg IV 3-4 times a day.
2. Patient should be kept 'nil by mouth' and should be given adequate intravenous fluids and electrolytes.
3. Blood transfusion to be given as per requirement.
4. Patient switched over to oral steroids and amino-salicylates to be started as in A (1) after 5 days, when patient is allowed to take orally.

If patient fails to respond to steroids, refer the patient to gastroenterologist for immunosuppressive therapy or surgery.

Once the remission is induced, steroids are tapered slowly over 4-6 weeks period. For acute attack, there is no use of giving steroids for more than 12 weeks.

Follow-up. Close clinical/biochemical/radiological monitoring is required for any complications like toxic megacolon/perforation.

D. Maintenance of remission

1. Any of the drugs used in A(1) should be given life long.

Reference

1. Irritable Bowel Syndrome. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp. 2496-2501.

AMOEBIC LIVER ABSCESS (ALA)

Liver abscess is the commonest extraintestinal form of amoebiasis, caused by *E. histolytica*.

Clinical features

- Acute fever,
- Right upper quadrant abdominal pain - dull ache or pleuritic in nature.
- In elderly -low abdominal pain, intermittent fever and general symptoms.
- Complications -rupture of abscess into pleural, pericardial or rarely peritoneal cavity.

Diagnosis

- Elevated blood counts/ESR/serum alkaline phosphatase,
- One or more hypoechoic lesions in liver on ultrasonography
- Positive test for antibodies to *E. Histolytica* in high titre
- Examination of pus of the parasite is usually negative.

Treatment

Nonpharmacological

Hydrotherapy, if the fever is high.

Pharmacological

1. Tab. Metronidazole 800 mg 3 times a day for 7-10 days

Or

Tab. Tinidazole 2 g as a single dose for 7-10 days

In Children, 50 mg/kg (up to 2 g) orally once a day with food for 3-5 days. Close monitoring is recommended, when treatment duration exceeds 3 days.

If patient is very toxic, Inj. Metronidazole 500 mg given 8 hourly until patient improves. Switch over to oral therapy whenever possible.

Indications for aspiration of amoebic liver abscess

1. If doubt about possibility of pyogenic abscess.
2. No improvement with medical—one very close to the surface of liver.
3. Impending rupture of abscess—one very close to the surface of liver.
4. Left lobe abscess if large, to prevent rupture in to pericardium.

Reference

1. Amoebiasis and Infection with Free Living Ameba. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp 1683-1688.

PYOGENIC LIVER ABSCESS

Pyogenic abscesses in liver are usually caused by spread of infection from peritoneum, abdominal viscera like appendicitis/diverticulitis/portal pyaemia or disease of biliary tract mostly by coliform organisms.

Clinical Features

- Fever ,
- Abdominal pain,
- Toxaemia,
- Appendicular pain/mass
- Mostly abscesses are small and multiple.

Investigations

- Full blood counts,
- Usg of abdomen,
- Blood culture,
- Examination of pus including culture.
- CT scan, MRI are seldom indicated.

Treatment

Drainage—percutaneous catheter or open surgical—remains the mainstay of treatment.

Nonpharmacological

If patient is toxic, should be kept nil by mouth and given IV fluids as per requirement.

Pharmacological

Initial empirical treatment should include broad-spectrum antibiotic(s):

1. Third generation cephalosporin such as Inj. Cefoperazone 1-2 g IV 12 hourly
2. Inj. Gentamicin 3 mg/kg/day IV in 3 divided doses
3. If source of abscess is intra-abdominal sepsis, Inj. Metronidazole 500 mg IV 3 times a day should be added.

If the abscess is atleast 5 cm in diameter or the response to antibiotic therapy is not rapid, intermittent needle aspiration per cutaneous catheter drainage should be necessary.

Reference

1. Intra-abdominal Infections and Abscesses. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp 1077-1083.
2. Current medical Diagnosis and treatment 2015 Pg 677.

ACUTE PANCREATITIS

Acute inflammation of pancreas, usually caused by alcohol or gallstone migrating through the common bile duct. Less commonly caused by trauma, infections like mumps, ascariasis and drugs like diuretic, azathioprine, etc.

Clinical Features

- Acute onset, constant upper abdominal pain 'penetrating through to the back', may be partially relieved by sitting with trunk flexed and knees drawn up.
- In severe cases, there is anorectal paralytic ileus, vomiting, abdominal distension, jaundice and fever.

Diagnosis

- Increased serum amylase, three or more times the normal,
- Serum lipase elevation is more specific for pancreatitis.
- Ultrasonogram or ct scan further help to confirm the diagnosis.
- Ranson Criteria for severity of acute pancreatitis

Three or more of the following predict a severe course complicated by pancreatic necrosis with a sensitivity of 60-80%

Age over 55 years

WBC count $> 16 \times 10^3$ /mcl ($> 16 \times 10^9$ /L)

Blood glucose > 200 mg/dl (> 11 mmol/L)

Serum lactic dehydrogenase > 350 U/L (7mkat/L)

Aspartate aminotransferase > 250 U/L (5mkat/L)

Development of the following in the first 48 hrs indicates a worsening prognosis

Haematocrit drop of > 10 percentage points

Blood urea nitrogen rise > 5 mg/dl (> 1.8 mmol/L)

Arterial pO ₂ <60 mm Hg (<7.8kPa)	
Serum calcium < 8 mg/dl	
Base deficit > 4mEq/L	
Mortality rates correlate with number of criteria present	
Number of criteria	Mortality Rate
0-2	7%
3-4	16%
5-6	40%
7-8	100%

Treatment

Nonpharmacological

- Send blood for complete blood count, amylase, KFT, LFT, blood sugar, serum triglycerides and arterial blood gases. Repeat the test at 48 hours, early if indicated. Start oral intake after 48-72 hours depending upon appearance of bowel sound and relief in pain.
- Fats should be avoided until acute phase settles.

Pharmacological

The goals of initial management is fluid replacement, electrolyte balance, calorie support and prevention of local and systemic complications. Prompt transfer to an intensive care unit should take place for sustained organ failure.

If no signs of hypovolaemia:

1. Infusion Dextran saline - 1 L
2. Infusion Dextran - 1 L
3. Inj. Potassium chloride (KCl) 60-80 mmol (20 mmol added to 50 ml of IV fluid)
4. If signs of hypovolaemia: Add polymer from degraded gelatin 500-1000 ml.
5. Nasogastric tube aspiration—if evidence of paralytic ileus, abdominal distension and vomiting.
6. Inj. Diclofenac sodium 75 mg IM 2-3 times a day.
7. If pain is not relieved, Inj. Tramadol 50 mg IM, repeated 6-8 hourly, if needed. Patient with severe necrotizing pancreatitis (as diagnosed by contrast enhanced CT) should be managed by a specialist.
8. Enteral nutrition. Parenteral nutrition is rarely indicated. The route of nutritional support must be tailored to the individual patient, and modified depending on the patient's response and tolerance.

Use of prophylactic antibiotics to prevent pancreatic infection is not recommended.

Sterile necrosis is best managed medically during the first 2-3 weeks. In case of infected necrosis, CT-guided percutaneous aspiration with Gram's stain and culture is recommended, when infected necrosis is suspected. Treatment of choice in infected necrosis is surgical debridement. Alternative minimally invasive approaches may be used in selected circumstances.

References

1. Approach to the Patient with Pancreatic Disease. In: Harrison's Principles of Internal Medicine.

- Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp. 2629-2633.
2. Acute and Chronic Pancreatitis. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp. 2634-2649.
 3. Peter A. Banks, Martin L. Freeman, and the Practice Parameters Committee of the American College of Gastroenterology. Practice Guidelines in Acute Pancreatitis. Am J Gastroenterol 2006;101:2379–2400

CHRONIC PANCREATITIS

Usually caused by chronic alcohol consumption or possibly malnutrition in tropics.

Clinical Features

- Chronic diarrhoea due to malabsorption,
- Upper abdominal pain and diabetes mellitus.

Diagnosis confirmed by pancreatic function tests, ERCP or MR pancreatography.

Treatment

Nonpharmacological

Alcohol should be stopped. Dietary modification includes use of 'coconut oil' as the source of fat, restriction of sugars/refined carbohydrates, if patient has impaired glucose tolerance.

Pharmacological

Aim is to supplement pancreatic lipase during meals (30,000 IU lipase required with each meal)

1. Cap. Pancreatin 170 mg, 2 capsules to be taken during the meal and 2 capsules after the meal.
2. Cap. Omeprazole 20 mg twice a day to be taken 30 min before meals.

Or

Cap. Lansoprazole 30 mg twice a day.

Or

Tab. Pantoprazole 40 mg twice a day.

3. Tab. Diclofenac 50 mg to be taken as and when required for pain.

Or

Tab Tramadol 50 mg twice a day.

4. If diabetes not controlled with diet, for drug therapy (see section on Diabetes Mellitus).

Reference

1. Acute and Chronic Pancreatitis. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp. 2634-2649.

GASTROINTESTINAL (GI) BLEEDING

Upper GI bleed - bleeding from pharynx to duodenojejunal (DJ) flexure presents as haematemesis or melaena (black, tarry, sticky, foul smelling stools). Bleeding from GIT distal to DJ flexure is called lower GI bleed.

Clinical Features

Active bleed is indicated by presence of fresh blood in vomitus, nasogastric tube aspirate, melaena, passage of fresh blood in stool.

Diagnosis

- Clinical history,
- Examination and radiological/ endoscopic examination.

Treatment

Acute GI bleed is an emergency and needs active management. An assessment of activity and severity of bleed should be done immediately.

Nonpharmacological

- Maintain vital signs (blood pressure, airways, respiration, temprature).
- Insert a large bore IV cannula and send the blood samples for Hb, TLC, platelets, coagulation profile, renal and liver function tests, blood grouping and cross-matching.
- Start IV fluids like normal saline/ Ringer's lactate/ polymer from degraded Gelatin.
- Severity of GI bleed is assessed as mild (patient has tachycardia but blood pressure is maintained), moderate (tachycardia with postural hypotension, tachypnoea, sweating, cold skin) and severe (hypotension and shock).
- Replace blood as soon as available, if moderate to severe bleed or active bleed.

Pharmacological

1. Inj. Ranitidine 300 mg IV if non-variceal upper GI bleed suspected (patient with known peptic ulcer or reflux disease, taking NSAIDs).
2. If variceal bleed is suspected (chronic alcoholic, jaundice, splenomegaly, dilated abdominal veins, ascites, encephalopathy);

Inj. Octreotide 50 mcg IV immediately followed by 25 mcg/hour infusion.

Or

Inj. Terlipressin 1-2 mg IV given 4-6 hourly.

Or

Inj. Vasopressin 20 IU in 200 ml of normal saline over 20 min.

Maintenance dose is given as 100 units in 50 ml of 5% dextrose given as 0.2-0.9 units/min (6-27 ml/h) in the next 24 hours; avoid in ischaemic heart disease (IHD). Nitroglycerine drip can also be used along with this, if systolic BP is >90 mmHg.

3. In patients with major peptic ulcer bleeding (active bleeding or non-bleeding visible vessel) following endoscopic haemostatic therapy, Inj. Omeprazole or Pantoprazole 80 mg IV bolus followed by 8 mg/hour infusion for 72 hours).

References

1. Gastrointestinal Bleeding. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp. 320-323.
2. Management of Acute Upper and Lower Gastrointestinal Bleeding. Scottish Intercollegiate Guidelines Network (SIGN) 2008.

CHAPTER 7

INFECTIONS – BACTERIAL, VIRAL AND OPPORTUNISTIC

TETANUS

An acute neurological disorder resulting from contamination of a wound (may be a trivial one) by an obligate anaerobic organism *Clostridium tetani*.

Clinical features

- Generalized tetanus- starts with trismus or lockjaw followed by rigidity, violent, painful, generalized muscle spasms and seizures provoked by slightest stimulation.
- Generalized muscle spasms may compromise respiration.
- Fever and tachycardia

Grade I or mild—muscle rigidity with few or no spasms.

Grade II or moderate—trismus, dysphagia, rigidity, and short-lasting spasms.

Grade III or severe—frequent explosive spasms, autonomic dysfunction particularly sympathetic over-activity may be present.

Grade IV or very severe—features of grade III plus violent autonomic disturbances involving the CVS—severe hypo- or hypertension.

Treatment

Nonpharmacological

- Admit in a quiet room/ICU with minimum stimulation,
- Cardiopulmonary monitoring,
- Protection of airways/respiratory support (intubation/tracheostomy) with or without ventilation,
- Cleaning/exploration/debridement of wound.
- Maintain hydration and enteral/parenteral nutrition with high calorie and high protein diet.

Pharmacological

Give following to all patients:

- (1) Inj. Crystalline penicillin 2 mega units 6 hourly IV for 10 days.

Or

Inj. Metronidazole 500 mg 8 hourly or 1 g 12 hourly.

(Other antibiotics may be required according to need of infected wound).

- (2) Inj. Human Tetanus Immunoglobulin (TIG) 3000-5000 units IV or IM.

Or

Inj. Equine antiserum, 10,000 units by slow IV Injection after sensitivity test (If Human TIG is not available).

Antiserum should be given before local manipulation of the wound.

(**Caution:** Tetanus immunoglobulin does not produce natural immunity and a full course of immunization with tetanus toxoid should be administered once the patient has recovered).

Grade I tetanus. As above in nonpharmacological

(1) Tab. Diazepam 5-20 mg 3 times a day in mild tetanus; slow IV infusion; not to exceed a dose of 80-100 mg in 24 hours.

(2) If spasms not controlled.

Inj. Phenobarbitone 200 mg IM every 8-12 hours.

Or

Inj. Chlorpromazine 50 mg IM in adults 4 times a day.

The ideal sedative and muscle relaxant schedule for each patient should be individualized. An objective guide to decrease in rigidity is relaxation of abdominal muscles.

Grade II. (1) As above for Grade I

(2) Tracheostomy.

(3) Inj. Magesium sulphate 40 mg/kg IV loading dose followed by infusion of 1.5 mg/h to control muscle spasms.

Grade III and IV. (1) As above for Grade II

(2) Ventilator support.

(3) Inj. Pancuronium 2-4 mg IV.

Or

Inj. Gallamine 20-40 mg IV.

(4) In case of hypotension

Inj. Dopamine/Dobutamine 10-40 mcg/kg/min infusion titrated to maintain systolic BP of 100 mm Hg.

If bradyarrhythmias, Inj. Atropine 0.6-1.2 mg IV. If hypertension, see Chapter 3 for details

References

1. Tetanus. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp. 1197-1200.
2. Tetanus. In: Oxford Textbook of Medicine. Warrell DA, Cox TM, Firth JD, Benz EJ Jr. (eds), 4th Edition, Oxford University Press, 2003; pp. 1.545-1.551.
3. New Trends in the management of Tetanus. Expert Rev Anti-Infect Ther 2004; 2: 73-84.

HIV AND AIDS

HIV infection leads to progressive immune deficiency that characterizes the disease and is responsible for the opportunistic infections that complicate the illness.

I) Case Definition of AIDS in Children (up to 12 years of age)

The positive tests for HIV infection by ERS (ELISA/RAPID/SIMPLE) in children above 18 months or confirmed maternal HIV infection for children less than 18 months. **AND** Presence of at least

(158)

two major and two minor signs in the absence of known causes of immunosuppression.

Major signs:

- (a) Loss of weight or failure to thrive which is not known to be due to medical causes other than HIV infection,
- (b) Chronic diarrhoea (intermittent or continuous) >1 month duration,
- (c) Prolonged fever (intermittent or continuous) > 1 month duration.

Minor signs:

- (a) Repeat common infections (e.g. pneumonitis, otitis, pharyngitis, etc.),
- (b) Generalised lymphadenopathy,
- (c) Oropharyngeal candidiasis,
- (d) Persistent cough for more than 1 month,
- (e) Disseminated maculopapular dermatosis

II) Case Definition of AIDS in adults (for persons above 12 years of age)

Two positive tests for HIV infection by ERS test (ELISA/RAPID/SIMPLE) AND

Any one of the following criteria:

- (a) Significant weight loss (>10% of body weight) within last one month/Cachexia (not known to be due to a condition other than HIV infection) AND chronic diarrhoea (intermittent or continuous) >1 month duration or prolonged fever (intermittent or continuous) >1 month duration
- (b) Tuberculosis: Extensive pulmonary, disseminated, miliary, extrapulmonary tuberculosis
- (c) Neurological impairment preventing independent daily activities, not known to be due to the conditions unrelated to HIV infection (e.g. trauma)
- (d) Candidiasis of the oesophagus (diagnosable by oral candidiasis with odynophagia)
- (e) Clinically diagnosed life-threatening or recurrent episodes of pneumonia, with or without aetiological confirmation
- (f) Kaposi sarcoma
- (g) Other conditions: Cryptococcal meningitis, neurotoxoplasmosis, CMV retinitis, *Penicillium marneffei*, recurrent herpes zoster or multi-dermatomal herpes infection and disseminated molluscum

HIV disease is characterized by three phases: acute primary illness, asymptomatic chronic illness and symptomatic chronic illness.

Essential laboratory investigations:

- HIV serology,
- CD4⁺,
- T lymphocyte counts (if available) or total lymphocyte count (TLC),
- Complete blood count and chemistry profile,
- Pregnancy test.

Supplementary tests indicated by history and physical examination:

- ChestX-ray,
- Urine for routine and microscopic examination,
- Hepatitis C virus (HCV) and hepatitis B virus (HBV) serology .

PRE- AND POST-TEST HIV COUNSELLING

Counselling is the confidential dialogue between a client and a care provider aimed at enabling the client to cope with stress and take personal decision related to HIV/AIDS.

Components of pretest counselling:

1. Assessment of risk and likelihood and meaning of positive, negative and indeterminate test result.
2. Assess and educate regarding the understanding of HIV transmission and natural history, window period and differentiation between HIV infection and full-blown AIDS.
3. Discuss confidentiality provisions and anonymous testing.
4. Assess psychological stability, social support and impact of a positive result.
5. Ensure follow up and discuss risk reduction plan and referral to other services, if needed.
6. Obtain informed consent for HIV antibody testing.

Components of post-test counselling:

1. The results of HIV testing should always be given in person and under all precautions of keeping confidentiality.
2. Disclose test results and provide interpretation (positive, negative, indeterminate) in the context of that person's risk of infection.
3. If test is negative, readdress and reinforce risk reduction plan especially regarding safer sexual practices. Discuss the need for repeat testing for those with recent (<6 months) exposure or ongoing risk behaviour.
4. If test is positive, counsel about the meaning of a positive HIV test; differentiate with full-blown AIDS and ways to avoid transmitting HIV to others. Assess need for psychological support and provide referrals for medical, psychological or social service, if necessary. Emphasize the importance of early clinical intervention and schedule follow-up visit to assess psychological status and to address partner notification issues.

Antiretroviral therapy–Assessment for initiation:

Prior to starting antiretroviral therapy in any HIV infected patient:

1. Determine the clinical stage of HIV infection.
2. A detailed history and physical examination that focus on past significant illness (especially related to HIV), identify current, ongoing HIV associated illnesses or opportunistic infections (OI) that require treatment, identify other co-existing medical conditions.
3. Determine the eligibility and need for ART and OI prophylaxis.

4. Laboratory investigations – including a CD4 count that will help in staging the disease and determining the need to start ART.
5. Identify and manage other high-risk behaviours—injecting drug use, unprotected sex, etc.

WHO Clinical staging of HIV/AIDS for adults and adolescents

Clinical stage 1

- Asymptomatic
- Persistent generalized lymphadenopathy

Clinical stage 2

- Unexplained moderate weight loss (<10% of presumed or measured body weight)
- Recurrent respiratory tract infections—sinusitis, tonsillitis, otitis media, pharyngitis
- Herpes zoster
- Angular cheilitis
- Recurrent oral ulceration
- Papular, pruritic eruptions
- Seborrhoeic dermatitis
- Fungal nail infections

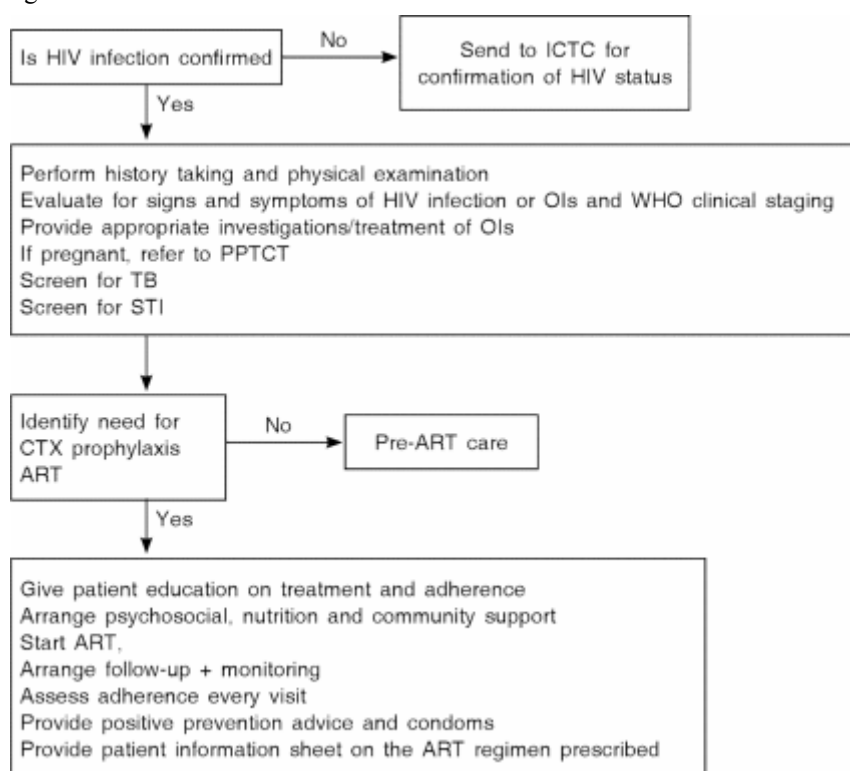


Fig. 7.1. Assessment and management of HIV-infected person.

Clinical stage 3

- Unexplained severe weight loss >10% of presumed or measured body weight.
- Unexplained chronic diarrhoea of more than 1 month.
- Unexplained persistent fever >37.5° C intermittent or constant for >1 month .
- Persistent oral candidiasis.
- Oral hairy leukoplakia.
- Pulmonary tuberculosis.
- Severe bacterial infections—pneumonia, empyema, pyomyositis, bone or joint infections, meningitis, bacteremia.
- Acute necrotizing ulcerative stomatitis, gingivitis or periodontitis.
- Unexplained anaemia < 8 g/dl, neutropenia < 500 /cumm, and/or chronic thrombocytopenia

Clinical stage 4

- Recurrent severe bacterial pneumonia
- HIV wasting syndrome Pneumocystis pneumonia
- Chronic herpes simplex infection—orolabial, genital or anorectal >1 month or visceral infection at any site
- Oesophageal candidiasis Extrapulmonary tuberculosis Kaposi sarcoma
- Cytomegalovirus infection—any site CNS toxoplasmosis
- HIV encephalopathy
- Extrapulmonary cryptococcosis—including meningitis Disseminated non-tuberculous mycobacterial infections Progressive multifocal leukoencephalopathy
- Chronic cryptosporidiosis, isosporiasis Disseminated mycosis
- Lymphoma – cerebral or B cell NHL Invasive cervical carcinoma Atypical disseminated leishmaniasis
- Recurrent septicaemia
- Symptomatic HIV associated nephropathy or cardiomyopathy

Antiretroviral therapy

The goals of ART are:

1. **Clinical goals** – prolongation of life and improvement in quality of life.
2. **Virological goals** – Prolonged suppression of viral replication to undetectable levels (HIV RNA <50-75 copies/ml).
3. **Immunological goals** –immune reconstitution that is both qualitative and quantitative.
4. **Therapeutic goals** –rational sequencing of drugs in a fashion that achieves clinical, virological and immunological goals while maintaining treatment options, limiting drug toxicity and facilitating adherence.
5. **Epidemiological goals** –reduction of transmission of HIV in individuals and in the

community.

The currently available antiretroviral drugs are classified as:

Nucleoside reverse transcriptase inhibitors (NRTIs): Zidovudine (AZT, ZDV); Stavudine (d4T); Lamivudine (3TC); Didanosine (ddI); Zalcitabine (ddC); Abacavir (ABC); Emtricitabine (FTC); Tenofovir (TDF)

Non-nucleoside reverse transcriptase inhibitors (NNRTI): Nevirapine (NVP); Efavirenz (EFV); Delavirdine (DLLV)

Protease inhibitors (PIs): Saquinavir (SQV); Ritonavir (RTV); Nelfinavir (NFV); Amprenavir (APV); Indinavir (INV); Lopinavir/ritonavir (LPV); Fosamprenavir (FPV); Atazanavir (ATV); Tipranavir (TPV)

Fusion inhibitors (FI): Enfuvirtide (T 20)

CCR5 antagonist: Maraviroc

Integrase inhibitor: Raltegravir

Initiation of ART based on CD4 count and clinical staging (Table 7.1)

Though CD4 count is used as a guide to initiate ART, ART must not be delayed in any patient, if he is clinically eligible according to WHO clinical staging. However a CD4 count must be ordered as soon as possible.

Important points to consider:

1. Offer ART to symptomatic patients if, CD4 count is 200-350 cells/cu mm.
2. Consider ART in asymptomatic patients with CD4 count 200-350 cells/cu mm and monitor closely for new symptoms.
3. The optimum time to start ART is when the patient is symptomatic and develops the first opportunistic infection (OI).
4. Ensuring good adherence is essential to the success of ART regimen. The patient must be assessed for readiness to start ART and must be counselled in detail about adherence – its benefits and the harms of non-adherence. Patients need at least 2

Table 7.1. Guidelines for the initiation of ART based on CD4 count and clinical staging

WHO Clinical Staging	Recommendations
<i>HIV infected Adults & Adolescents and children > 5 years of age</i>	
WHO Clinical Staging I and II	Start ART if CD4 ≤ 500 cells/cu mm
WHO Clinical Staging III and IV	Start ART regardless of CD4 count
<i>All Children < 5 years of age</i>	
Any clinical stage	Start ART regardless of CD4 count
<i>All pregnant/breast feeding women</i>	
Any clinical stage, any trimester of pregnancy	Start ART regardless of CD4 count as soon as pregnancy is detected
<i>HIV-TB co-infected patients</i>	

WHO Clinical Staging	Recommendations
Patients with HIV and TB co-infection (Pulmonary or Extrapulmonary)/Patients with past history of TB	Start ART regardless of CD4 count -Start ATT first; initiate ART as early as possible between 2 weeks-2 months. -For patients with CD4 below 50 cells/cmm, start ART simultaneously with ATT with strict clinical and laboratory monitoring.
<i>HIV-Hepatitis B co-infected patients</i>	
HIV and HBV/HCV co-infection – without any evidence of severe chronic liver disease	Start ART if CD4 ≤ 500 cells/cu mm
HIV and HBV/HCV co-infection – with evidence of severe chronic liver disease	Start ART regardless of CD4 count
<i>Visceral Leishmaniasis(Kala-Azar) co-infected patients</i>	
Patients with HIV-Visceral Leishmaniasis(Kala-Azar) co-infected/ patients with past history of Visceral Leishmaniasis	Start ART regardless of CD4 count

It is recommended that all patients should be started with a three drug combination from two different classes, namely NRTI and NNRTI (Table 7.2.). Different ART regimen approved for use by NACO are as shown in Table 7.3.

Table 7.2. Preferred ART regimen available through the NACO

Drug	Recommendation
Tenofovir 300 mg+ Lamivudine 300mg+ Efavirenz 600 mg	Irrespective of any parameter it is regime of choice
ZIN/ALN	If intolerance to TLE and Hb > 11 g/dl
ALN	If Hb < 11 g/dl
Stavudine	Has been phased out
Efavirenz	Now not contraindicated in pregnancy

- For children 3-5 yrs of age with Hb > 9 g/dl – start ART irrespective of CD4 count. Drug of choice ZLN (paediatric)
- If Hb < 9 g/dl ALN (paediatric)
- If on ATT then substitute Nevirapine with Efavirenz or PPI
- In children < 3 yrs of age and infants – ABC+3TC+LPV/r
- In HIV exposed newborn give syrup Nevirapine at birth till 6 weeks of age then cotrimoxazole syrup for prophylaxis till 18 months of age.

Table 7.3. The ART regimen approved for use by NACO

National ART Regimen	regimen	Indications	Availability
Regimen I	Zidovudine + Lamivudine + Nevirapine		First line regimens available at all ART centers Alternate first line ART made available at 10 centers of excellence
Regimen I(a)	Stavudine* + Lamivudine + Nevirapine	For patients with Hb < 9 g/dl	
Regimen II	Zidovudine + Lamivudine + Efavirenz	Preferred for patients on anti-tuberculosis treatment and Hb > 9 g/dl	
Regimen II (a)	Stavudine* + Lamivudine + Efavirenz	For patients on anti tuberculosis treatment and Hb < 9 g/dl	
Regimen III	Tenofovir + Lamivudine + Nivirapine	For patients not tolerating ZDV or d4T on an NVP-based regimen	
Regimen III (a)	Tenofovir + Lamivudine + Efavirenz	For patients not tolerating ZDV or d4T on an EFV-based regimen	
Regimen IV	Zidovudine + Lamivudine + Atazanavir/Ritonavir	For patients not tolerating both NVP and EFV, and Hb > 9 g/dl	
Regimen IV (a)	Stavudine + Lamivudine + Atazanavir/Ritonavir	For patients not tolerating both NVP and EFV, and Hb < 9 g/dl	
Regimen V	Tenofovir + Lamivudine + Atazanavir/Ritonavir		Second line ART made available at 10 centres of Excellence

Dosages

Stavudine – 30 mg twice daily Zidovudine – 300 mg twice daily Lamivudine – 150 mg twice daily

Nevirapine – 200 mg once daily as lead in dose for 2 weeks followed by 200 mg twice daily

Efavirenz – 600 mg once daily

Drug combinations and strategies NEVER to be used:

1. Monotherapy or dual therapy for the management of HIV infection
2. Combination of AZT and 3TC
3. d4T and ddI
4. Unboosted PIs
5. Structured treatment interruptions

Important considerations:

1. Nevirapine is the first choice NNRTI in ART regimens. Efavirenz is preferred over NVP when:
 - a. There is significant NVP toxicity
 - b. Patients have associated TB
2. Efavirenz is now not contraindicated in pregnant HIV-infected women.
3. Do not start ART in the presence of an active, ongoing OI. OIs should be treated or at least stabilized before ART is started.
4. Follow-up and monitoring is essential in patients initiated on ART.
5. Monitor for clinical effect, adverse effects and toxicities.

The Table 7.4 highlights the major toxicities observed with the ARVs.

Definition of ART failure (first line regimen):

1. **Clinical failure:** New or recurrent WHO stage 4 condition after at least 6 months of ART
2. **Immunological failure:**
 - a. Fall of CD4 count to pre-therapy or baseline
 - b. 50% fall from the on treatment peak value
 - c. Persistent CD4 levels below 100 cells/cu mm
3. **Virological failure:** Plasma viral load > 10,000 copies/ml

Table 7.4. Major drug toxicities

Toxicity	Possible drug responsible
Hepatitis	NVP, EFV, uncommon with NRTIs
Acute pancreatitis	ddI, Lamivudine
Lactic acidosis	All NRTIs
Hypersensitivity	NVP, Abacavir
Rash, Stevens Johnson syndrome	NVP, EFV (rarely)
Peripheral neuropathy	Stavudine, ddI
Haematological toxicity—anaemia	ZDV
Lipodystrophy	All NRTIs especially d4T
Neuropsychiatric symptoms	EFV
Dyslipidaemia, insulin resistance	All protease inhibitors
Renal toxicity	Indinavir
GI intolerance	Most ARVs

OCCUPATIONAL HIV EXPOSURE AND HIV

POST-EXPOSURE PROPHYLAXIS (PEP)

PEP refers to the comprehensive management given to minimize the risk of infection following potential exposure to blood-borne pathogens (HIV, HBV, HCV). This includes counselling, risk assessment, relevant laboratory investigations based on informed consent of the source and exposed person, first aid and depending on the risk assessment, **the provision of short term (4 weeks) of antiretroviral drugs**, with follow-up and support. The following stepwise approach to occupational exposure is recommended:

Step 1: Management of exposure site—first aid

For skin—if the skin is broken after a needle-stick or sharp instrument:

Immediately wash the wound and surrounding skin with water and soap, and rinse. Do not scrub; do not use antiseptics or skin washes (bleach, chlorine, alcohol, betadine).

After a splash of blood or body fluids to unbroken skin:

Wash the area immediately; do not use antiseptics.

For the eye: Irrigate exposed eye immediately with water or normal saline.

Sit in a chair, tilt head back and ask a colleague to gently pour water or normal saline over the eye. If wearing contact lens, leave them in place while irrigating, as they form a barrier over the eye and will help protect it. Once the eye is cleaned, remove the contact lens and clean them in the normal manner. This will make them safe to wear again; do not use soap or disinfectant on the eye.

For mouth: Spit fluid out immediately; rinse the mouth thoroughly, using water or saline and spit again. Repeat this process several times; do not use soap or disinfectant in the mouth.

Step 2: Define the category of exposure

Category definition

Mild exposure: Mucous membrane/non-intact skin with small volumes, e.g. a superficial wound (erosion of the epidermis) with a plain or low caliber needle, or contact with the eyes or mucous membranes, subcutaneous injections following small-bore needles.

Moderate exposure: Mucous membrane/non-intact skin with large volumes or percutaneous superficial exposure with solid needle, e.g. a cut or needle stick injury penetrating gloves.

Severe exposure: Percutaneous with large volume, e.g. an accident with a high caliber needle (>18 G) visibly contaminated with blood; a deep wound (haemorrhagic wound and/or very painful); transmission of a significant volume of blood; an accident with material that has previously been used intravenously or intra-arterially.

Step 3: Determination of risk in source

Source HIV status definition of risk in source

HIV negative—source is not HIV infected but consider HBV and HCV.

Low risk—HIV positive and clinically asymptomatic.

High risk—HIV positive and clinically symptomatic (see WHO clinical staging)

Unknown—status of the patient is unknown, and neither the patient nor his/her blood is available

for testing (e.g. injury during medical waste management the source patient might be unknown). The risk assessment will be based only upon the exposure (HIV prevalence in the locality can be considered).

Post Exposure Prophylaxis Regime

- Wherever PEP is indicated and source is ART naïve or unknown recommended regime is Tenofovir 300 mg+ Lamivudine 300mg+ Efavirenz 600 mg once daily for 28 days. Wherever available single pill should be used. Dual drug regimes should not be used.
- First dose should be given as early as possible preferably within 2 hours of exposure and subsequent dose at bedtime 2-3 hrs after dinner.
- In case of intolerance to Efavirenz regime containing tenofovir+lamivudine+ PI(ATV/r or LPV/r) can be used after consultation by expert physician.
- In case of exposure where source is on ART, Tenofovir 300 mg+ Lamivudine 300mg+ Efavirenz 600 mg should be started immediately And an expert opinion should be sought urgently by phone/e-mail from CoE/ART plus centre.

Aetiology	Presenting signs and symptoms	Diagnostics (laboratory, X-ray and others)	Management and treatment	Unique features, prophylaxis
<i>Pulmonary tuberculosis</i>	Cough for >2 weeks, not responding to antibiotic treatment Purulent or blood-stained sputum Night sweats Weight loss Evening fevers	Chest X-ray: Miliary pattern, hilar adenopathy, pleural effusion, focal infiltrates in upper and hilar regions Multilobar infiltrates Interstitial infiltrates Cavitation with severe immunosuppression, X-ray might appear normal. Sputum in adults: 2 samples recommended: one on the spot, one early morning (day 2)	The management and treatment of TB is as per RNTCP guidelines following the DOTS regimen Start ART after 2 weeks of initiation of ATT for all patients with CD4 <350 cells/cu mm (as soon as patient is stabilized. For patients with CD4 >350, defer ART	More common with HIV and worsens HIV disease Atypical presentation if there is severe immunosuppression Pulmonary TB at any CD4 level; disseminated TB usually at CD4 <200 cells/cu mm

Start ATT if CD4 < 50/cumm irrespective of symptoms

Prophylaxis for TB to be given to all HIV patients with no clinical symptoms of active TB after 3 months of initiation of ART.

Extrapulmonary TB and HIV: Start ART after 2 weeks of initiation of ATT in all patients irrespective of CD4 count (as soon as patient is stabilized, special attention to monitoring hepatotoxicity).

For details of prevention of parent to child HIV transmission (PPTCT), see Chapters 15 and 19.

OPPORTUNISTIC INFECTIONS

Definition of opportunistic infections (OIs)

An opportunistic infection is a disease caused by a microbial agent in the presence of a compromised host immune system.

Table 7.7. Common opportunistic infections and their management

I. Pneumocystis carinii pneumonia (PCP)

Pneumocystis carinii pneumonia is a fungus that infects the lungs

Symptoms	Typically fever, dry cough and progressive difficulty breathing. Also weight loss, night sweats and fatigue.
Presentation time frame	Subacute onset of symptoms over a period of weeks
CD4 count	<200
Diagnosis	X-ray, induced sputum or bronchoscopy, serum LDH.
Severity of disease	Severe disease – breathless at rest or $\text{PaO}_2 < 50$ mmHg breathing room air. Moderate disease – breathless on minimal exertion, PaO_2 50-70 mmHg breathing room air at rest. Mild disease – breathless on moderate exertion, $\text{PaO}_2 > 70$ mmHg breathing room air at rest.
Preventive therapy (prophylaxis)	Indicated when CD4+ cell counts equal or are below 200 and/or symptomatic HIV. Preferred: TMP/SMX (two single-strength tablets daily or one double-strength tablet daily or three times a week). A gradual increase in TMP/ SMX dose may help reduce the incidence of an adverse reaction to the drug.
Stopping preventive therapy	Able to stop, if CD4 cell count remain above 200 for more than 3 months measured on 2 separate occasions over at least 3 months on highly active antiretroviral therapy.
Treatment	Management of PCP depends on the degree and severity of disease <ol style="list-style-type: none"> 1. Severe disease – hospitalize, intravenous TMP/SMX (3-4 mg/kg/day for 21 days), supplemental oxygen. Patients with severe hypoxaemia ($\text{PaO}_2 < 70$ mm Hg breathing room air at rest) should be given corticosteroids (prednisolone 1 mg/kg per day for 5 days with gradual tapering of dose until completion of acute treatment. 2. Moderate disease – an oral regimen can be used and management can proceed on an out-patient basis, although hospitalization should be considered. Recommended oral regimen: TMP/SMX 480 mg 2 tabs twice a day for 21 days. 3. Mild disease – Oral TMP/SMX as above.

Toxicities of treatment	<p>TMP/SMX – hypersensitivity (typically fever and maculopapular rash), nausea and vomiting, bone marrow toxicity, hepatitis,</p> <p>Dapsone– hypersensitivity, haemolysis in people with G6PD deficiency</p> <p>Clindamycin – hypersensitivity, diarrhea</p> <p>Atovaquone – hypersensitivity, GI, hepatitis</p> <p>Pentamidine – renal impairment, pancreatic, cardiac dysrhythmias, Hypotension</p>
Alternative therapies	<p>Dapsone 100 mg once a day for 21 days – preferred second line Option</p> <p>Clindamycin 450 mg 4 times a day + primaquine 15 mg once daily for 21 Days</p> <p>Trimethoprim 300 mg once a day for 21 days</p> <p>Atovaquone 750 mg once a day for 21 days</p> <p>Pentamidine (intravenous) 3-4 mg/kg/day for 21 days</p>
Maintenance therapt	Everyone who has had PCP should be on maintenance therapy. The choice is the same as those for primary preventive therapy.
Stopping maintenance therapy	<p>There is some evidence that it may be possible to stop maintenance therapy, if CD4 cell counts stay above 200 on antiretroviral therapy.</p> <p>However, there is insufficient data to make a current recommendation.</p>

II. Oesophageal candidiasis

Candidiasis is a fungal infection that frequently occurs in the mouth and vagina. It is considered to be an opportunistic infection when it occurs in the oesophagus.

Symptoms	Difficulty in swallowing, painful swallowing, or retrosternal discomfort. Weight loss is common.
Presentation time frame	Subacute over weeks
CD4 count	<100
Diagnosis	Usually made clinically in the presence of oral candidiasis and dysphagia. Endoscopy is only indicated in those who fail to respond to a clinical trial of appropriate treatment. The diagnosis of oesophageal candidiasis should be reconsidered, if oral candidiasis is not present. Associated fever and oral ulceration are not common.
Preventive therapy (prophylaxis)	Not recommended because current drugs effectively treat the disease, antifungal resistance may develop, and drug-drug interactions may occur.
Treatment	Fluconazole 100-200 mg once a day for 2 weeks is the treatment of choice.
Alternative treatment	Amphotericin 0.3-0.5 mg/kg/day;
Maintenance therapy	Fluconazole (50-100 mg once a day)

Stopping maintenance therapy	There is evidence that patient who achieves CD4 counts >100 on ART may cease maintenance therapy.
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III. Cryptococcosis

Cryptococcus is a fungus that is inhaled but has a predilection for the meninges

Symptoms	Meningitis – headaches, nausea, fever, malaise, altered mental status, irritability and seizures. Lung involvement may co-exist – cough, chest pain, breathlessness.
Presentation time frame	Subacute with progressive symptoms over weeks to months or acute with symptoms over days.
CD4 count	<100
Diagnosis	Usually by lumbar puncture to test for presence of <i>Cryptococcus</i> or cryptococcal antigen in cerebral spinal fluid, India Ink preparation. ICP is often raised, CSF protein and glucose are generally normal and there may be few white blood cells.
Preventive therapy (prophylaxis)	Not currently recommended
Treatment	Preferred: IV Amphotericin B (0.5-0.8 mg/kg daily) + Flucytosine (100 mg/day) 4 times a day) for 2 weeks then Fluconazole (400 mg daily) for 8 to 10 weeks.
Alternative treatment	Liposomal Amphotericin
Maintenance therapy	Fluconazole 200 mg once a day. Pregnant women should avoid azole drugs.
Stopping maintenance therapy	Not currently recommended because of the few people studied. Cohort studies suggest that maintenance therapy can be ceased in patients with sustained CD4 response to ART (CD4 >200) for >3 months.

IV. Toxoplasmosis

Toxoplasmosis is a parasite that has a predilection for the brain

Symptoms	Altered mental state (confusion, unusual behaviour), headache, fever, seizures, paralysis and coma.
Presentation time frame	Acute to subacute over days to weeks
CD4 count	<100
Diagnosis	Typical appearance on CT (computed tomography) or MRI (magnetic resonance imaging) scan. Diagnosis is frequently presumptive on the basis of appearance on scan. If no response to appropriate empirical anti-toxoplasmosis therapy after 2 weeks, then consider brain biopsy to rule out CNS lymphoma.
Preventive therapy (prophylaxis)	Indicated when CD4+ cell counts are below 200 (for primary PCP prophylaxis). Preferred: TMP/SMX (1 double-strength every 12 hours three times a

Stopping preventive therapy	week; or a single-strength or 1 double-strength tablet once a day).
Treatment	CD4+ cell counts above 200 for over 3-6 months. Pyrimethamine 100-200 mg loading dose and then 50-75 mg once a day given in combination with sulphadiazine 4-6 g/day 4 times a day or Clindamycin 2.4 g /day 4 times a day for 6 to 8 weeks duration depending upon response if sulphadiazine is used then Folinic acid 25 mg once a day should be given to prevent haematological toxicity Corticosteroids may be used in the presence of significant cerebral oedema.
Alternative treatment	Pyrimethamine in combination with one of the following: Azithromycin 1-1.5 mg/day Atovaquone 3 g/day Dapsone 100 mg/day Clarithromycin 2 g/day
Maintenance therapy	Preferred: Pyrimethamine (25-75 mg once a day) + sulphadiazine (500-1,000 mg four times a day for several days with leucovarin.)
Stopping maintenance therapy	Stopping maintenance therapy is not currently recommended

V. Cryptosporidiosis

Cryptosporidiosis is a parasite that infects the GI tract and can cause symptoms

Symptoms	Chronic diarrhoea with frequent watery stools, abdominal cramps, nausea, fatigue, weight loss, loss of appetite, vomiting, dehydration, electrolyte imbalance (especially sodium and potassium) and fever.
Presentation time frame	Acute to chronic presentation over days to weeks or months in some cases
CD4 count	<100
Diagnosis	Stool examination for detection of acid-fast oocysts in the stool or biopsy of small intestine. A specific request for examination for Cryptosporidiosis is required (special lab techniques are needed)
Preventative therapy (prophylaxis)	There are no proven effective therapies. There is no good evidence that boiling water or the use of water filters prevents disease
Treatment	There are no proven effective therapies. Symptomatic treatment includes Loperamide, codeine and somatostatin analogues. Nitazoxanide up to 2 g/day can be used. Immune recovery induced by ART alone results in excellent clinical responses
Maintenance therapy	There are no proven therapies that prevent cryptosporidiosis.

OI Prophylaxis:

Opportunistic infection	Primary prophylaxis indicated when CD4 is	Drug of choice	Discontinue primary prophylaxis when CD4 is	Discontinue secondary prophylaxis when CD4 is
PCP	<200	TMP-SMX 1 daily	>200	
Toxoplasmosis	< 100	TMP-SMX 1 DS daily	>200	
CMV retinitis	Not indicated	Secondary: oral ganciclovir	Not applicable	>100
Cryptococcus meningitis	Not indicated	Secondary: fluconazole	Not applicable	>100
Oral and oesophageal candidiasis	Not indicated	Not applicable	Not applicable	Not indicated

DS—double strength

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CHAPTER 8

PARASITIC INFECTIONS

INTESTINAL PROTOZOAL INFECTIONS

Patients of amoebiasis and giardiasis commonly present as asymptomatic carriers.

AMOEBIASIS (INTESTINAL)

Infection is caused by intestinal protozoa—*Entamoeba histolytica*. Infection usually spreads by infective cysts in stool which contaminate food and drinking water.

Clinical Features

- Lower abdominal pain, mild diarrhoea develop, may lead to full blown dysentery.
- 0-12 stools per day with blood and mucous and little faecal matter. Caecal involvement may mimic acute appendicitis.
- Chronic form, can be confused with inflammatory bowel disease. May present as amoeboma.
- Fulminant amoebic colitis may occur and present with more severe diarrhoea, abdominal pain and fever leading to intestinal perforation.
- Untreated or incompletely treated intestinal infection may result in amoebic liver abscess and involvement of other extraintestinal site.

Diagnosis - demonstration of cysts and/or trophozoites of *Entamoebahistolytica* in the stool.

Treatment (asymptomatic cyst passers)

Tab. Diloxanide furoate 500 mg 8 hourly for 10 days.

Treatment (acute amoebic dysentery and chronic infections)

1. Tab. Metronidazole 400-800 mg 8 hourly orally with food for 10 days. In children, 15 mg/kg divided in three doses for 7 days.

Or

Tab. Tinidazole (300 mg, 500 mg and 1 g) 2 g orally as single dose with food. In children, 50 mg/kg as a single dose.

2. Tab. Diloxanide furoate 500 mg 8 hourly for 10 days. In children, 20 mg/kg/day in three divided doses for 10 days.

For treatment of amoebic liver abscess (see Chapter 6 on Gastrointestinal Diseases).

GIARDIASIS

Intestinal disease caused by protozoal parasite—*Giardia lamblia*. The disease spreads by direct faeco-oral transmission.

Clinical features

- Acute giardiasis—diarrhoea, abdominal pain, bloating, belching, flatus, nausea and vomiting. Duration is > 1 week.
- Chronic giardiasis—one or more episodes of acute diarrhoea, increased flatus, loose stools, abdominal distension, borborygmi, eructation of foul tasting gas and passage of foul smelling flatus, and weight loss.
- Severe disease may result in malabsorption, weight loss, growth retardation and dehydration.

Diagnosis- demonstration of cysts and/or trophozoites of *G. lamblia* in the stools.

Treatment

Tab. Tinidazole 2 g as a single dose with food.

In children, 50 mg/kg as a single dose with food.

Or

Tab. Metronidazole 400 mg every 8 hours for 7 days with food.

In children, 15 mg/kg divided in three doses for 7 days.

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WORM INFESTATION

HOOKWORM INFESTATION

Infection is caused by *A. duodenale* and *N. americanus*.

Clinical Features

- Asymptomatic or present with symptoms of anaemia (hypochromic microcytic).

- Pruritic maculopapular dermatitis (ground itch) at the site of skin penetration by infective larvae.
- Serpigenous tracts of subcutaneous migration in previously sensitized hosts.
- Mild transient pneumonitis because of larvae migration through lungs.
- Intestinal manifestations—epigastric pain often with post-prandial accentuation, inflammatory diarrhoea.
- Major consequences—progressive iron deficiency anaemia and hypoproteinaemia leading to weakness, shortness of breath and skin depigmentation.

Diagnosis- demonstration of ova of *A. duodenale* and/or *N. americanus* in the stool and occult blood.

Treatment

Tab. Mebendazole 100 mg 12 hourly for 3 days in children above 2 years of age. (**Caution:** Contraindicated in children less than 2 years)

Or

Tab. Pyrantel Pamoate (250 mg); Syr. (250 mg/5 ml) 10 mg/kg body weight once daily for 3 days.

(**Caution:** Not recommended in children below one year of age)

In children > 1 year, Susp. Pyrantal pamoate 10 mg/kg as a single dose.

Or

Tab. Albendazole 400 mg as a single dose.

In children 1-2 years of age, Syr. Albendazole 200 mg as a single dose:

In children > 2 years, Syr. Albendazole 400 mg as a single dose.

For treatment of anaemia (see section on Anaemia).

ASCARIASIS (ROUNDWORM INFESTATION)

Ascariasis is caused by *Ascaris lumbricoides*, Infection spreads by orofaecal route.

Clinical features

- Mostly asymptomatic.
- Pulmonary - irritating nonproductive cough, bronchospasm or pneumonitis and burning substernal discomfort aggravated by coughing or deep inspiration, dyspnoea, fever, eosinophilic pneumonitis.
- Heavy intestinal infection—pain abdomen, small bowel obstruction which may get complicated by perforation, intussusception or volvulus.
- Aberrant migration of a large worm may cause biliary colic, cholangitis, cholecystitis, pancreatitis and oral expulsion of the worm.

Treatment

Tab. Mebendazole 100 mg 12 hourly for 3 days.

(Caution: Contraindicated in children less than 2 years) **Or**

Tab. Pyrantel pamoate 11 mg/kg as a single dose. **Or**

Tab. Albendazole 400 mg as a single dose. In heavy infestation, however, a 2-3 day course is indicated.

(Caution: Contraindicated in pregnancy)

In children between 1-2 years: Albendazole Susp (200 mg/5 ml) 200 mg as a single dose; in children more than 2 years Syr./Tab. Albendazole 400 mg as a single dose.

Partial intestinal obstruction may be managed with nasogastric suction, IV fluid administration and instillation of piperazine through nasogastric tube. Complete obstruction and other surgical complications require surgical referral for intervention.

ENTEROBIASIS

Infection is caused by *Enterobius vermicularis* (pinworm).

- Mostly asymptomatic.
- Cardinal symptoms - perianal pruritus, worse at night due to migration of female worms. Excessive itching can lead to perianal excoriation and bacterial superinfection. Sometimes associated with enuresis in children.
- Heavy infection causes abdominal pain and weight loss.
- Rarely, in females, vulvovaginitis and pelvic or peritoneal granulomas occur. Eosinophilia.

Diagnosis-demonstration of the ova of *Enterobius vermicularis* in perianal swabs or a cellophane tape should be pressed against perianal skin. In the morning, when the child gets up, eggs stick to the tape and can be examined under the microscope.

Treatment

Tab. Mebendazole 100 mg as a single dose in adults and children more than 2 years of age.

(Caution: Contraindicated in pregnancy and in children below two years of age).

Or

Tab. Pyrantel pamoate 11 mg/kg body weight as a single dose.

Or

Tab. Albendazole 400 mg as a single dose.

Children (1-2 years)- Syr. Albendazole 200 mg as a single dose; More than 2 years 400 mg as a single dose.

Repeat treatment after two weeks.

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1. Infectious Diseases: Protozoal and Helminthic. In: Current Medical Diagnosis and Treatment. Lawrence M Turney Jr, Stephen J McPhee, Maxine A Papadakis (eds), 43rd Edition, McGraw-Hill Company Inc. USA, 2004; pp. 1400-1451.
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KALA-AZAR

Also called visceral leishmaniasis, caused by *Leishmania donovani*, a protozoan transmitted mostly through bite of sandfly.

LEISHMANIASIS

Leishmaniasis is caused by parasitic protozoa of the genus *Leishmania*. Humans are infected via the bite of phlebotomine sandflies.

Clinical Features

There are four main types of the disease:

- **Cutaneous**- skin ulcers on exposed areas, such as the face, arms and legs. Heal within a few months, leaving scars.
- **Diffuse cutaneous leishmaniasis**- disseminated and chronic skin lesions resembling those of lepromatous leprosy.
- **Mucocutaneous** - lesions can partially or totally destroy the mucous membranes of the nose, mouth and throat cavities and surrounding tissues.
- **Visceral leishmaniasis/ kala-azar**- high fever, substantial weight loss, swelling of the spleen and liver, and anaemia. High Fatality- 100% within two years.
- Fever, abdominal discomfort due to a large spleen, weight loss, malaise and general debility.
- Early cases - asymptomatic splenomegaly. Late cases - wasted, febrile and show hyperpigmentation of face, hands and feet.
- Massive splenomegaly; moderate hepatomegaly and lymphadenopathy.

Diagnosis

- Clinical features,
- Presence of pancytopenia,
- Hypergammaglobulinaemia and hypoalbuminaemia
- Rapid dipstick test based on the recombinant k39 protein,
- Confirmed by demonstration of LD bodies in the bone marrow/splenic aspirate.
- Serological tests (elisa) are useful for field diagnosis.

Treatment

Blood transfusion.

Nonpharmacological

Cold sponging, rest and high protein diet.

Pharmacological

Nonspecific.

- (1) Tab. Paracetamol 500-1000 mg 6-8 hourly to reduce fever.
- (2) Treatment of intercurrent infections.

Specific.

Inj. Sodium Stibogluconate 200 mg test dose followed by 20 mg/kg slow IV injection to reduce the risk of local thrombosis for 28 days. IM injection is painful thus IV route is preferred although cough is the common side effect specially when the volume is high.

Or

Inj. Amphotericin B 1 mg/kg/day on alternate day for 15 days.

(**Caution:** Vomiting and diarrhoea seen commonly; cause hepatotoxicity, renal toxicity, cardiac toxicity, the treatment of the patients under strict supervision and on indoor basis should be undertaken.)

Drug of choice in patients not responding to Sodium Stibogluconate.

Tab. Miltefosine in adults (>12 years and weight >25 kg) 100 mg/day in two divided doses after meals for a period of 28 days. In adults (<25 kg) 50 mg once daily after food for 28 days.

In children (2-11 years), 2.5 mg/kg daily after meals, i.e. 50 mg/day once a day for 28 days

(**Caution:** NOT to be used in children below 2 years and in pregnancy, or women in child bearing age not using any contraceptive or lactating mothers).

Treatment with Miltefosine is provided as Directly Observed Therapy (DOTS). Stop miltefosine, if any skin rashes or gastrointestinal symptoms develop and refer the patient to higher treatment centre. Consider monitoring of renal and hepatic functions wherever feasible as about 1% patients may develop nephrotoxicity or hepatotoxicity.

Other drugs that have been found useful are:

Inj. Pentamidine isoethionate 4 mg/kg/day for 15-30 days IV/IM or alternate day. (**Caution:** Adverse effects include nephrotoxicity, bone marrow suppression, hypoglycaemia, diabetes mellitus, pancreatitis and arrhythmia related sudden death)

Or

Inj. Aminosidine (Aminoglycoside) 12-15 mg/kg/day IM for 21 days per-orally particularly in HIV positive patients.

Clinically, patient feels better and becomes afebrile during the first week of treatment. Return of pancytopenia, abnormal liver function, serum albumin, splenomegaly and weight gain may take weeks or months.

Reassessment at 6 weeks and 6 months to detect any relapse.

Patient is said to be cured, if no clinical relapse occurs during the first 6 months of follow-up. There is no need to prove absence of parasite as a marker for cure.

Treatment of relapse

Inj. Sodium Stibogluconate 20 mg/kg/day for at least 8 weeks with frequent monitoring for parasite count.

Or

Inj. Amphotericin B in doses mentioned above. **Or**

Liposomal Amphotericin B 2-5 mg/kg/day IV on days 1-5, 14 and 21 for a total of 21 mg/kg.

Post-kala-azar dermal leishmaniasis (PKDL)

Tab. Miltefosine in adults (>12 years and weight >25 kg) 100 mg/day in two divided doses after meals for a period of 28 days. In adults (<25 kg), 50 mg once daily after food for 12 weeks.

In children (2-11 years), 2.5 mg/kg daily after meals, i.e. 50 mg/day once a day for 12 weeks.

(Caution: NOT to be used in children below 2 years and in pregnancy, or women in child bearing age not using any contraceptive or lactating mothers). ***Treatment with***

Miltefosine is provided as Directly Observed Therapy (DOTS) Or

Patient not responding to the first-line of drug or the drug is discontinued due to toxic effect, women during pregnancy, lactating mothers and their babies, children less than two years of age, PKDL patient with liver or kidney disease Inj. Amphotericin B 1 mg/kg/day very slowly IV infusion in 6 to 8 hours in 5% dextrose after mixing the drug in water for injection for up to 60-80 doses over 4 months. **(Caution:** Vomiting and diarrhoea seen commonly; cause hepatotoxicity, renal toxicity, cardiac toxicity, the treatment of the patients under strict supervision and on indoor basis should be undertaken.)

(Caution: Follow standard protocols for hydration premedication and renal function monitoring). Adverse effects include nephrotoxicity).

Special situations

Patients co-infected with HIV respond slowly, require longer treatment and are more liable to relapse.

References

1. Leishmaniasis. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp. 1709-1716.
2. Leishmaniasis. In: Oxford Textbook of Medicine, Warrell DA, Cox TM, Firth JD, Benz EJ Jr. (eds), 4th Edition, Oxford University Press, 2003; 1.777-1.783.
3. Guidelines on Vector Control in Kala-Azar Elimination. Directorate of National Vector Borne Disease Control Programme. Government of India: [www. nvbdcp.gov.in](http://www.nvbdcp.gov.in).
4. Antimicrobial therapy in visceral Leishmaniasis. Rational Antimicrobial Practice in Paediatrics (under IAP Action Plan 2006) pp. 271-273.
5. Guidelines on Use of Miltefosine. Directorate of National Vector Borne Diseases Control Programme. Government of India. [http://nvbdcp.gov.in/Doc/Guidelines%20on%20Miltefosine. pdf](http://nvbdcp.gov.in/Doc/Guidelines%20on%20Miltefosine.pdf). Accessed on 21.9.12
6. Guidelines for Treatment of Post-Kala-azar Dermal Leishmaniasis (based on WHO Technical Report Series 949) <http://nvbdcp.gov.in/Doc/PKDL-Guidelines-220512.pdf> 2012.

CHAPTER 9

CENTRAL NERVOUS SYSTEM DISEASES

MIGRAINE

Benign and recurring syndrome of headache, nausea, vomiting and other neurological symptoms in various admixtures.

Clinical Features

- A. At least 5 attacks fulfilling criteria B-D.
- B. Headache attacks lasting 4-72 h (untreated or unsuccessfully treated)
- C. Headache has at least two of the following characteristics:
 - 1. Unilateral location
 - 2. Pulsating quality
 - 3. Moderate or severe pain
 - 4. Aggravation by or avoidance of routine physical activity.
- D. During attack at least one and the following
 - 1. Nausea and/or vomiting
 - 2. Photophobia and phonophobia
- E. Not attributed to another disorder.
- Migraine may also be preceded by focal neurological phenomenon called “aura” most commonly experienced as visual alteration (flickering lights, spots; loss of vision) but it may involve sensory symptoms (pins and needles numbers) or fully reversible dysphasic speech disturbance.
- May be mild (nondescript-tight band like discomfort often involving the entire head) or severe throbbing headache associated with vomiting, scalp tenderness with or without other neurological features.

Treatment

Nonpharmacological

Identify and avoid trigger factors such as alcohol, foods (chocolate, cheese), irregular sleep patterns and stress levels. Also assess menstrual cycle relationships in female patients.

Pharmacological

A staged approach to migraine pharmacotherapy

- 1. **In case of mild migraine**, i.e. occasional throbbing headaches, no major impairment of functioning.

Tab. Aspirin 650 mg stat; if required can be repeated after 4 hours.

Or

Tab. Ibuprofen 400-800 mg stat; if required can be repeated after 6 hours; maximum 3 times/day.

Or

Tab. Paracetamol 1000 mg stat; if required can be repeated after 4 hours. **Or**

Cap. Indomethacin 50 mg stat; if required can be administered 3 times a day. If associated nausea and vomiting, Tab. Metoclopramide 10 mg stat.

2. **In case of moderate to severe headache**, i.e. three severe attacks of headache month with significant impairment of functioning and marked nausea or vomiting.

Tab. Ergotamine 2 mg sublingual at onset and after half an hour (maximum 6/day, 10/week).

Or

Tab. Ergotamine (1 mg) + Caffeine (100 mg) 1/2 tab at onset, then 1 tab half hourly (maximum 6/day, 10/week).

Or

Tab. Ergotamine (2 mg) + Caffeine (100 mg) suppository; 1 suppository at onset (max 6/day, 10/week).

(A subnauseating dose should be determined preferably during headache free period).

Or

Tab. Sumatriptan 25-100 mg orally at onset.

Or

Inj. Sumatriptan 6 mg SC at onset (may repeat once in 24 hours). (**Caution:** Contraindicated in ischaemic heart disease and hypertension).

Or

Inj. Diclofenac 75 mg IM at onset.

Refer patient with severe migraine to hospital, if attack is not controlled by above and if the patient is dehydrated. Also consider prophylactic medications.

Hospital management of acute migraine

1. Inj. Metoclopramide 10 mg IV.
2. Inj. Sumatriptan 6 mg SC (may repeat once in 24 hours).

(**Caution:** Contraindicated in ischaemic heart disease and hypertension).

Or

Inj. Prochlorperazine 12.5 mg in 25-50 ml saline slow push over 2 minutes can be given twice or thrice a day.

Or

Inj. Chlorpromazine 7.5-20 mg in 25-50 ml saline slow push over 2 minutes can be given twice or thrice a day.

(**Caution:** Monitor carefully for orthostatic hypotension. Administer IV diphenhydramine,

if acute dystonic reaction occurs).

3. In severe headache unresponsive to other drugs, Inj. Pethidine 50-100 mg IM as a single dose.
4. Status migranous (A debilitating migraine attack lasting for more than 72 hours) Inj. Dexamethasone 4 mg/ml 2 ml IV 8 hourly for 2 days.

Or

Inj. Sodium Valproate 500 mg IV 8 hourly for 2 days.

Prophylaxis

Consider prophylactic treatment, if number of attacks is two or more attacks per month or each attack is very severe necessitating loss of work time. Frequent headaches (more than two a week) or a pattern of increasing attacks with risk of developing medication overuse headache or failure of, contraindication to, troublesome side effects from acute medications.

Tab. Atenolol 80-320 mg daily.

Or

Tab. Metoprolol 100-450 mg daily.

Or

Tab. Propranolol 80-320 mg daily.

Or

Tab. Amitriptyline 10-50 mg at bed time.

Or

Tab. Cyproheptadine 4-16 mg daily in children.

Or

Tab. Flunarizine 5-10 mg daily.

Or

Tab. Topiramate 50-200 mg daily for obese patients

Or

Tab. Sodium Valproate 50-100 mg/day for obese patients

If found to be effective, it should be continued for at least 6 months and then slowly tapered and if headache recurs after discontinuation of prophylactic therapy, the medication regime should be reinstated for another 6 months trial.

References

1. Headache Classification Committee of the International Headache Society. Classification and Diagnostic Criteria for Headache Disorders, Cranial Neuralgias and Facial Pain. Cephalalgia 2004; 24 (Suppl 1): 1-195.
2. Campbell JK, Penzien DB, Wall EM. Evidence-based Guidelines for Migraine Headache: Behavioural and Physical Treatments available at www.aan.com/professionals/practice/guidelines/index.cfm accessed on July 2007.
3. Headache. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp. 112-128.

NEUROCYSTICERCOSIS

This disease is produced by invasion of the CNS by the cystic stage (cysticercus) of pork-tapeworm (*Taenia solium*). Human beings acquire the disease, when they ingest the food or water contaminated with the eggs of *T. solium*.

Clinical Features

- Asymptomatic
- CNS - seizures, encephalitis, meningitis, hydrocephalus, or increased intracranial pressure.
- Neurologic, cognitive or personality disorder
- Ocular cysticercosis - decreased visual acuity
- Spinal neurocysticercosis-cord compression, nerve root pain, transverse myelitis, or meningitis.

Neuroimaging (CT/MRI) is the investigation of choice.

Treatment

The aim of therapy is to control symptoms, i.e. convulsions and hydrocephalus.

Pharmacological

Antiepileptic drugs (for control of seizure, see Epilepsy section in Chapter 1). If there is no calcification and the patient is free of seizures for 2 years, treatment can be gradually discontinued.

Cysticidal drugs accelerate the destruction of the parasites, resulting in faster resolution of the infection. Refer the patient to a hospital (to a physician or neurologist) for supervised treatment with following:

Tab. Albendazole 15 mg/kg/day (max 800 mg/day) in 2 divided doses per day for 8 days, taken with fatty meals. Before administering a two to three days priming with Tab. Prednisolone 1 mg/kg for 3 days.

(**Caution:** Absolute contraindications are ocular cyst, or spinal medullary cysts, heavy cyst burden, increased intracranial pressure).

Surgical treatment is indicated in case of ocular cysticercosis, ventricular cyst or hydrocephalus.

References

1. Cysticercosis. In: Nelson's Textbook of Paediatrics. Behrman RE, Kliegman RM, Jenson HB (eds), 19th Edition, Harcourt Publishers International Company, 2011; pp. 1234-1237.
2. Infectious Focal CNS Lesions. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp. 2637-2638.
3. Neurocysticercosis. American Epilepsy Society. Epilepsy Curr 2004; 4: 107-111.

ACUTE BACTERIAL MENINGITIS

The three main pathogens, *Haemophilus influenzae*, *Streptococcus pneumoniae*, and *Neisseria meningitidis*.

Clinical Features

- Fever, headache, neck stiffness, photophobia, nausea, vomiting and altered mental status (lethargy to coma).
- Infants, elderly, and immunocompromised patients - only mild behavioural changes, low-grade fever and little clinical evidence of meningeal inflammation.
- Focal cerebral findings,
- Seizures

Diagnosis

- Urgent lumbar puncture (LP)-CSF examination, CSF culture & gram staining
- CECT before LP- focal findings or clinical evidence of raised intracranial pressure

CSF examination-elevated pressure (200-500 mm H₂O) and protein (100-500 mg/dl, normal 15-45 mg/dl), decreased glucose (<40% of serum glucose), and marked pleocytosis (100-10,000 white blood cells/μl, (normal <5) with 60% or greater polymorphonuclear leucocytes. Early in disease, 10-20% of patients have CSF cell counts less than 1,000 cells/μl. Otherwise, cell counts below 1,000 cells/μl in a patient with a compatible clinical syndrome indicate partially treated meningitis, concurrent immunosuppression, or a nonbacterial cause.

The likelihood of finding Gram's stain or culture-positive CSF may decrease, if antibiotics are administered before doing LP. Petechial or purpuric rash suggests *N. meningitidis*, or, less often, *Staphylococcus aureus*, *Pneumococcus*, or the *Rickettsiae*.

Treatment

Nonpharmacological

Hospitalize in a quiet place with no bright lights preferably in ICU.

Maintain vitals, endotracheal intubation in patient with poor respiratory effort. Elevation of head to 30° and hyperventilation, if evidence of raised intracranial pressure.

Pharmacological

Empiric antimicrobial to be initiated based on the patient's age and underlying disease status; once a bacterial pathogen is isolated, antimicrobial therapy can be modified for optimal treatment.

1. Inj. Ceftriaxone 4 g/day in 2 divided doses administered every 12 hours. It can also be administered as a single dose.

Or

Inj. Cefotaxime 8-12 g/day, in divided doses administered every 4 hours.

If age is more than 50 years to cover *Listeria monocytogenes* and *Pseudomonas* or in immunocompromised patients.

Inj. Ceftazidime 8 g/day in divided doses administered every 6 hours plus Inj. Ampicillin 10-12 g/day in divided doses every 4 hours.

Or

In case of resistant Gram-negative infection and are sensitive to Inj. Meropenem 1-2 g 8 hourly.

Continue treatment for 10-14 days with antibiotics. Clinical response is observed within

24-48 hours. Repeat lumbar puncture.

2. In case of head trauma, CSF rhinorrhoea, intracranial shunt or history of neurosurgical intervention, when penicillin or cephalosporin resistant strains of *Streptococcus pneumoniae* are suspected, add Inj. Vancomycin 500 mg IV 6 hourly.
3. In *H. influenzae* type-B meningitis, pneumococcal meningitis in children and in children over 2 months of age with neurological sequelae
Inj. Dexamethasone 0.15 mg/kg every 6 hour IV for 2 days. It should be started at the same time or shortly before, the first dose of antibiotic (not effective, if given after antibiotics).
4. In patient with papilloedema, altered sensorium, 6th nerve palsy, convulsions or decerbrate posturing Inj. Mannitol 20% 1 g/kg stat followed by 0.5 g/kg every 4-6 hours.
5. Chemoprophylaxis for close contacts of patients with meningococcal meningitis Cap Rifampicin 600 mg twice a day 5 days

Or

Cap Ciprofloxacin 500 mg single dose

Or

Tab. Ofloxacin 400 mg single dose

Or

Inj. Ceftriaxone 250 mg IM single dose.

Note: Diagnosis and management of underlying cause, e.g. CSOM is important.

References

1. Bacterial Infections. In: Neurology in Clinical Practice. WG Bradley, RB Daroff, GM Fenichel et al (eds), Butterworth-Heinemann, Boston: 1996; pp. 1181-1243.
2. Dexamethasone as Adjunctive Therapy in Bacterial Meningitis: A Meta-analysis of Randomized Clinical Trials Since 1988. JAMA 1997; 278: 925-931.
3. Treatment of Bacterial Meningitis. N Engl J Med 1997; 336: 708-716.
4. Acute Bacterial Meningitis in Adults. In: Current Clinical Topics in Infectious Diseases. Leemington JS, Swartz MN (eds), Blackwell Sciences, 1999; pp. 215-239.

TUBERCULOUS MENINGITIS

Clinical staging of patients with tuberculous meningitis

Stage I (early): Nonspecific symptoms and signs, no clouding of consciousness, no neurologic deficits.

Stage II (intermediate): Lethargy or alteration in behaviour, meningeal irritation, minor neurologic deficits (cranial, nerve palsies).

Stage III (advanced): Abnormal movement, convulsions, stupor or coma, severe neurologic deficits (paresis).

Investigations

CSF examination –

- CSF is clear /slightly opalescent,
- Pleocytosis (usually < 500 cells), with a predominant lymphocyte response.
- Raised protein, usually below 200 mg or when a spinal block develops may be as high as 1 to 1.5 g%,
- Sugar is reduced to 40 mg% or below.
- Smear-positivity in less than 10% of samples.

Treatment

Patient should be hospitalized.

1. Intermittent short course chemotherapy regimens of 6-9 months are recommended for all forms of extrapulmonary TB. In patients with poor or no response at 8 weeks of intensive phase may be given benefit of extension of IP for one more month. In case of TBM the continuation phase shall be extended by 3 months making the total duration of treatment to a total of 9 months. A further extension may be done for 3 more months in continuation phase (making the total duration of treatment to 12 months) on a case to case basis in case of delayed response and as per the discretion of the treating physician.

(for details of therapy, see Tuberculosis in Chapter 1).

2. Corticosteroids are indicated in stage II or III disease or in case of the impending or established spinal block and are given for 3-6 weeks and tapered slowly over 2-4 weeks.

Inj. Dexamethasone 8-16 mg/day in divided doses in adults. In children: 8 mg/day or 0.3-0.6 mg/kg/day.

Or

Tab. Prednisolone 60 mg/day or 1 mg/kg/day.

3. Urgent neurosurgical consultation and intervention (ventricular shunt) in case of hydrocephalus.
4. If signs and symptoms of increased intracranial pressure manage accordingly.
5. Seizures to be controlled with antiepileptic drugs (see section on Epilepsy in Chapter 1).

References

1. Technical Guidelines for Tuberculosis Control. Central TB Division. Directorate General of Health Services, Ministry of Health and Family Welfare, Nirman Bhawan, New Delhi, 2009.
2. Tuberculosis. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp. 1006-1020

HERPES SIMPLEX ENCEPHALITIS

Herpes simplex encephalitis (HSE) is the most common cause of fatal sporadic acute encephalitis having a mortality of 70-80%.

Clinical Features

- Acute/subacute onset of fever,
- Headache, altered consciousness

- Focal neurologic symptoms/signs- personality/ behaviour changes suggestive of a temporal lobe/frontal involvement.

Investigation

- CSF - mononuclear pleocytosis (50-200 cell/mm³), mildly raised protein and normal or mildly decreased sugar.
- CSF-PCR suggestive of HSV expression in CSF
- Contrast-enhanced MRI.
- EEG -slow waves/ PLEDS localized to temporal/frontal lobes.

Treatment

Hospitalize the patient preferably in a set-up with ICU facilities.

Nonpharmacological

- In patients with signs of increased intracranial pressure, raise head end of patient by 30°, intracranial pressure monitoring, and hyperventilation in intensive care unit.
- Maintain adequate hydration, however, in patients with syndrome of inappropriate ADH secretion (SIADH), restrict fluid intake.
(**Caution:** Prevent dehydration).

Pharmacological

For seizures (see section on Status Epilepticus).

1. Inj. Mannitol 20% 1 g/kg stat followed by 0.5 g/kg every 4-6 hours.

Or

Sol. Glycerol 30 ml 6 hourly orally.

2. Start empirical treatment with Acyclovir in all cases at a very early stage or suspected of HSE pending confirmation of the diagnosis.

(Role of steroids is controversial).

Inj. Acyclovir 10 mg/kg 8 hourly for 10 days. The drug should be diluted to a concentration not exceeding 7 mg/ml and infused slowly over 60 minutes (can cause local phlebitis, if extravasation occurs).

If diagnosis of HSE is definite, give treatment for 21 days to prevent relapse.

However, in a stable patient without documented evidence of HSE including negative CSF-PCR and a normal MRI, acyclovir can be discontinued after 5 days of presumptive treatment.

Reference

1. Meningitis, Encephalitis, Brain Abscess and Empyema. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp. 3410-3434.

(For treatment of acute meningoencephalitis in children see Chapter – 19).

JAPANESE ENCEPHALITIS

Japanese encephalitis (JE) is an acute viral infection of the central nervous system caused by JE

virus which is a flavivirus transmitted by the bite of infected Culex mosquitoes. The incubation period is usually 6 to 16 days (usually 4-6 days).

Clinical Features

- Mild infections - fever, headache.
- Severe infection - rapid onset, headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions (especially in infants) and paralysis.
- Neurological-movement disorder (Parkinson's features, dystonia, dyskinesia), seizures, focal weakness or mental retardation, and psychiatric sequelae are common among survivors.

Diagnosis

- Serological tests- haemagglutination-inhibition test- a fourfold rise in antibody (igg) titres in paired sera or igm antibody in serum and CSF.
- CT/MRI - low density non-enhancing areas in thalamus, basal ganglia and brainstem.

Treatment

Treatment of JE is supportive and symptomatic with mannitol, steroids, antiepileptic drugs and IV fluids.

Reference

1. Meningitis, Encephalitis, Brain Abscess and Empyema. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp. 3410-3434.

STROKE

Cerebrovascular disease (CVD)/stroke refers to rapidly developing clinical syndrome of focal or global loss of brain functions lasting for > 24 hours or leading to death with no apparent cause other than that of vascular origin.

Transient ischaemic attacks (TIAs) refer to when focal or global cerebral dysfunction disappears within 24 hours.

Stroke type & subtype	Clinical Features	Diagnosis	Treatment
Ischaemic stroke			
Lacunar infarct	Small<5mm lesions in the basal ganglia, pons, cerebellum, or internal capsule;less often in deep cerebral white matter; prognosis generally good; clinical features depend on locationbut may worsen over first 24-36 hrs.	MRI with diffusion weighted sequences usually defines the areas of infarction; CT is insensitive acutely but can be used to exclude haemorrhage.	Aspirin; long term management is to control risk factors (hypertension and diabetes)
Carotid	Signs vary depending on	Non contrast CT to	Select patients for

Stroke type & subtype	Clinical Features	Diagnosis	Treatment
circulation obstruction	occluded vessel	exclude haemorrhage but findings may be normal during first 6-24 hrs of ischaemic stroke; diffusion weighted MRI is gold standard for identifying acute stroke; ECG, ECHO, blood glucose, CBC, tests for hypercoagulable states, hyperlipidemia tests are indicated; Holter monitoring in selected cases; carotid duplex studies, CTA, MRA or conventional angiography in selected cases.	intravenous thrombolytics or intra-arterial mechanical thrombolysis; aspirin is first line therapy; anticoagulation with heparin for cardioembolic strokes when no contraindications exist.
Vertebrobasilar occlusion	Signs vary depending on occluded vessel	As for Carotid circulation obstruction	As for Carotid circulation obstruction
Haemorrhagic stroke			
Spontaneous intracerebral haemorrhage	Commonly associated with hypertension, also with bleeding disorders, amyloid angiopathy. Hypertensive haemorrhage is commonly located in basal ganglia and less commonly in the pons, thalamus, cerebellum, or cerebral white matter.	Non contrast CT is superior to MRI for detecting bleeds of < 48 hrs duration ; lab tests to identify bleeding disorder; angiography may be indicated to exclude aneurysm or AVM. Do not perform lumbar puncture.	Most managed supportively, but cerebellar bleeds or haematomas with gross mass effect may require urgent surgical evacuation.
Subarachnoid Haemorrhage	Present with sudden onset of worst headache of life , may lead rapidly to loss of consciousness, signs of meningeal irritation often present; etiology usually aneurysm or AVM, but 20% have no source identified.	CT to confirm diagnosis but may be normal in rare instances; if CT negative and suspicion high , perform lumbar puncture to look for RBC or xanthochromia; angiography to determine source of bleed in candidates for treatment.	Treatment of AVM and aneurysm
Intracranial aneurysm	Most located in the anterior circle of Willis and are typically asymptomatic until subarachnoid bleed occurs; 20% rebleed in first 2 weeks	CT indicates subarachnoid haemorrhage and angiography then demonstrates aneurysms, angiography may not	Prevent further bleeding by clipping aneurysm or coil embolization; nimodipine helps prevent vasospasm;

Stroke type & subtype	Clinical Features	Diagnosis	Treatment
		reveal aneurysm if vasospasm present.	reverse vasospasm by intravenous fluids and induced hypertension after aneurysm has been obliterated , if no other aneurysms are present; angioplasty may also reverse symptomatic vasospasm.
AVMs	Focal deficit from haematoma or AVM itself	CT reveals bleed and may reveal the AVM; may be seen by MRI. Angiography demonstrates feeding vessels and vascular anatomy	Surgery indicated if AVM has bled to prevent further neurological deficit , other modalities to treat nonoperable AVMs available at specialized centres.

References

1. Pauline Anderson. AHA/ASA releases updated Secondary Stroke-Prevention Guidelines. 2010 . <http://www.theheart.org/article/1140411.do> accessed on September 5, 2012.
2. New Guidelines on Primary Stroke Prevention from AHA/ASA The Heart.org. September 05, 2012.
3. Guidelines for the Management of Spontaneous Intracerebral Hemorrhage : A Guideline. Stroke. 2010;41:2108-2129.
4. AHA/ACCF Secondary Prevention and Risk Reduction Therapy for Patients With Coronary and Other Atherosclerotic Vascular Disease: 2011 Update. Circulation 2011; 124: 2458-2473.
5. Nervous system disorders. Current Medical diagnosis and treatment 2015, Pg 971.

ACUTE INFLAMMATORY DEMYELINATING NEUROPATHY/

GUILLAIN-BARRE SYNDROME (GBS)

GBS is an acute frequently severe fulminant polyradiculoneuropathy, usually presenting as ascending paralysis.

Clinical Features

- Progressive motor weakness of more than one limb and partial or total areflexia.
- Involvement of ventilatory muscles - respiratory distress/shallow respiration, weak voice, inability to cough effectively and decreased inability to count in single breath.
- Progression of symptoms up to 4 weeks, relative symmetry, mild sensory signs or symptoms, facial nerve (50%) or other cranial nerve involvement, transient or absent bladder involvement, recovery 2-4 weeks after nadir, autonomous dysfunction and absence of fever at the onset.

Investigations

- CSF - protein elevated after first week and cell count <10 mononuclear/mm;
- Electrophysiological evidence of demyelination - prolonged F-wave, distal latencies, decreased conduction velocities, conduction block.

Treatment

Nonpharmacological

- Hospitalization is necessary
- General care: care of back, bowel and bladder, pressure point
- Physiotherapy should be instituted early.
- Ventilatory support in impending respiratory failure (required in ~30% cases).

Pharmacological

Treatment should be started at the earliest and is not effective, if started after ~2 weeks of first motor symptoms.

Mild cases. No specific therapy is needed (corticosteroids have no role).

Severe cases. As indicated by progressive weakness requiring assistance for walking (power grade 3 or less), involvement of respiratory/bulbar muscles, swallowing difficulty.

Inj. Human immunoglobulins 400 mg/kg day for 5 days. (**Caution:** Contraindicated in patients with IgA deficiency). Or

If facilities are available, Plasmapheresis for a total of 4-5 exchanges over 7-10 days.

References

1. Neurology in Clinical Practice. Walter G. Bradley; Robert B. Daroff; Gerald M. Fenichel; C. David Mardson (eds), 3rd Edition; Butterworth Heinemann publishing (inprint of Elsevier; pp. 2336-2345).
2. Asbury AK, Comblath DR. Ann Neurol 1990; 27:521.

DEMENTIA

Dementia is a progressive and largely irrevocable clinical syndrome characterized by a widespread impairment of mental function. Vascular dementia is second most common cause of dementia after Alzheimer's disease.

Clinical Features

- Memory loss, language impairment, disorientation, changes in personality,
- Difficulties with activities of daily living, self-neglect,
- Psychiatric symptoms (e.g. apathy, depression or psychosis) and out-of character behaviour (e.g. aggression, sleep disturbance or disinhibited sexual behaviour, although the latter is not typically the presenting feature of dementia).

Diagnosis

- History, cognitive and mental & physical examination
- Routine haematology, biochemistry, thyroid function test, serum vitamin B₁₂ and folate

levels.

- MRI / CT scanning

Treatment

The common treatable causes of dementias are alcoholic, endocrinal–hypothyroidism, metabolic, infective and dementia related to head trauma (subdural haematoma).

Nonpharmacological

- Behavioural modification, scheduled toileting and prompt voiding reduces urinary incontinence.
- Reactivation occupational rehabilitation
 - Memory training
 - Maximal creative activity
 - Improving sensory motor function
 - Psychosocial functioning

Pharmacological (to be given by a specialist)

For cognitive deficits. For mild to moderate dementia (Mini-Mental State Examination(MMSE) score between 10 and 20).

Tab. Rivastigmine 1.5-6 mg/day in 2 divided doses (maximum dose 12 mg/day).

Or

Tab. Donepezil – 5-10 mg/day as a single dose.

Start with lowest dose and titrate to maximum dose in 4-6 weeks time.

For severe dementia, add 2nd line drug:

Tab. Mementine hydrochloride 5-10 mg as a single dose. Start with 5 mg and increase to 10 mg after 4 weeks.

Review after every 6 months by MMSE score and global, functional and behavioural assessment. Carer's views on the patients condition at follow-up also should be sought.

For noncognitive neuropsychiatry disturbances. Treat agitation or psychosis with dementia and depression accordingly (for details see section on Acute Psychotic Disorder and Depression in Chapter 16).

References

1. American Psychiatric Association. Diagnostic and statistical manual of disorder: DSM IV, 4th Edition, Washington, DC: American Psychiatry Association, 1994.
2. NICE Clinical Guidelines. NHS National Institute for Health and Clinical Excellence. Dementia, November 2006. Amendment March 2011.

PARKINSON'S DISEASE

Parkinson's disease (PD) refers to degeneration and depletion of the pigmented dopaminergic neurons in substantia nigra compacta.

Clinical Features

- Rigidity, bradykinesia and rest tremors (pill rolling movements along with abnormal gait and posture, onset is asymmetric).
- Difficulty in performing fine co-ordinated movements like writing, using hand tools and kitchen utensils, grooming, doing and undoing buttons.
- Difficulty in rolling in bed and getting out of chairs or automobiles.
- Gait difficulty with slowing, stooped posture, decreased or loss of arm swing. Limb discomfort and stiffness may be an early symptom.

Diagnosis clinical. As such no role of investigations.

Treatment

Nonpharmacological

Exercise: Occupational and physiotherapy improves activities of daily living alongwith mood and mobility.

Nutrition: A balanced diet with fibre supplement to be taken.

Pharmacological

‘Early disease’ refers to PD in people who have disease <5 years and have not developed motor complications. ‘Late disease’ refers to PD in people on levodopa who have developed motor complications. Figure 9.1 shows the algorithm for management of PD.

Early PD

For tremors predominant PD

Tab. Trihexyphenidyl 6-20 mg in 3 divided doses.

Or

Tab. Benztropine 1-6 mg in 2-3 divided doses.

(**Caution:** Avoid anticholinergics in patients above 65 years of age).

Late PD

1. Trihexyphenidyl as above.

Any of the following can be given as monotherapy or in combination.

2. Tab. Bromocriptine 2.5-10 mg/day in 2-3 divided doses.

Or

Tab Pramipexol 0.375-4 mg per day in 3 divided doses.

Or

Tab. Ropinirole 6-24 mg /day in 3 divided doses.

Or

Tab. Peribidil 25-100 mg/day as single dose or 2 divided doses.

3. Tab. Levodopa plus carbidopa (100-250 mg Levodopa) in divided doses as per requirement (modified release levodopa preparations should not be used so as to delay the onset of motor complication in people with early PD).

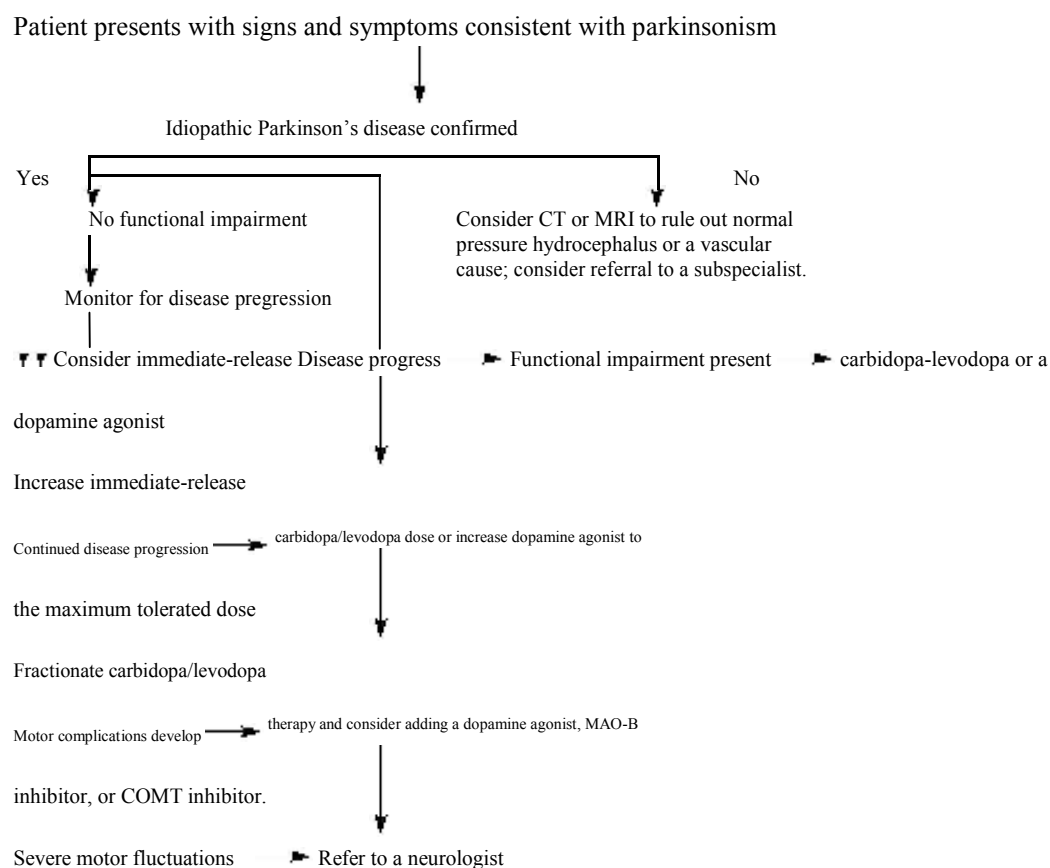


Fig. 9.1. Diagnosis and management of Parkinson's disease.

References

1. Parkinson's Disease. Diagnosis and Management in Primary and Secondary Care. NHS. National Institute for Health and Clinical Excellence. June 2006.
2. Rao SS, Hofmann LA, Shakil A. Parkinson's Disease. Diagnosis and Treatment 2006; 74: 2046-54.

CHAPTER 10

GENITOURINARY DISEASES

Glomerular disease can be –A. Nephritic or B. Nephrotic

Nephritic spectrum		
Asymptomatic Microscopic/Macroscopic Haematuria with/without proteinuria	Nephrotic Acute kidney injury with proteinuria of 1-3 g/d , Haematuria, RBC cast, Edema & hypertension	Rapidly Progressive Glomerulonephritis Acute kidney injury with proteinuria of 1-3 g/d , Haematuria, RBC cast, & systemic hypertension

NEPHROTIC SYNDROME

A clinical complex characterized by profuse proteinuria ($>3.5 \text{ g}/1.73 \text{ m}^2/24 \text{ h}$), oedema and hypoalbuminaemia. Causes—minimal change disease, membranous glomerulopathy, focal and segmental glomerulosclerosis, membrano-proliferative glomerulonephritis, diabetic nephropathy and amyloidosis.

Clinical Features

- Periorbital and generalized pitting oedema,
- Transudative pleural effusions, ascites, xanthomata.
- Hypercoagulability leads to peripheral arterial or venous thrombosis, renal vein thrombosis, and pulmonary embolism.
- Proteinuria of $>3\text{--}3.5 \text{ g}/24 \text{ h}$.
- Other abnormalities - hyperlipidaemia, lipiduria and hypercoagulability.

Investigations

Renal biopsy is indicated in all adults and children >10 years with nephrotic syndrome for establishing a definitive diagnosis, guiding therapy and estimating prognosis.

Treatment

Nonpharmacological

- Moderate salt restriction, usually 1-2 g/day (no cooking salt) and low cholesterol diet.
- High protein diet is not recommended. A protein intake of 0.8-1 g/kg/24 h of mainly first-class proteins is recommended.
- Fluid restriction is not usually required unless the oedema is severe.

Pharmacological

Nonspecific measures.

1. To reduce proteinuria in patients with diabetic nephropathy.

Tab. Captopril 6.25-25 mg/day in 4 divided doses.

Or

Tab. Enalapril 1.25-5 mg/day as a single dose **Or** Tab. Losartan 25-50 mg/day as single dose.

2. NSAIDs reduce proteinuria in some patients by altering glomerular haemodynamics but benefit must be weighed against risks.
3. Tab. Frusemide 80-250 mg/day in two divided doses (8 AM, 2 PM), depending upon the severity of oedema. The aim is to remove up to 1.0 kg/day of oedematous fluid.
In addition, if required, Tab. Spironolactone 100 mg once daily may be added.
4. Only in-patients with symptomatic thrombosis, Tab. Warfarin 2-4 mg/day (to titrate the dose to INR of 1.5-2.0).

Patients may be relatively resistant to heparin. **Specific.** Immunosuppression

Minimal change disease

Tab. Prednisolone 1-1.5 mg/kg/day for 4 weeks; followed by 1 mg/kg/day on alternate day for up to 16-24 weeks, depending upon the time to go into remission. Treatment of relapse is same unless the patients are resistant to steroids or relapse shortly after withdrawal of steroids (steroid dependent) or relapse occurs more than three times in a year, introduce following second line drugs:

Tab. Cyclophosphamide 2-3 mg/kg/day or Chlorambucil 0.1-0.2 mg/kg/day for 8-12 weeks.

(**Caution:** Adequate hydration must be maintained and monitor for side effects, e.g. cystitis, alopecia, infection, infertility, secondary malignancies).

If patients are resistant to the above cytotoxic drugs (third line) may induce remission in 60-80% of patients:

Tab./Cap Cyclosporin A 5 mg/kg daily in 2 divided doses as maintenance treatment reduced to lowest effective dose according to proteinuria and serum creatinine measurements; discontinue after 3 months, if no response. Monitor these patients for renal functions.

Focal and segmental glomerulosclerosis

Specific treatment—same as above.

Membranous glomerulopathy

Treat underlying disease. If idiopathic, steroids and immunosuppressive treatment have no role.

If patient goes into remission in 6 months time, maintenance treatment with low dose prednisolone alternating with Chlorambucil to be given by a specialist.

Membranoproliferative glomerulonephritis

No effective therapy; usually progress to ESRD over 5-10 years.

(**Caution:** Patients who do not respond to steroids are excellent candidates for renal transplant).

Rapidly progressive glomerulonephritis. Needs aggressive management preferably by a specialist

Inj. Methylprednisolone 1 g/day for 3 days followed by oral prednisolone as above.

Anti-GBM disease needs plasmapheresis.

(For treatment of Nephrotic Syndrome in children see Chapter-19).

References

1. Common Clinical Presentations and Symptoms in Renal Disorders. In: Oxford Textbook of Medicine. Warrell DA, Cox TM, Firth JD, Benz EJ Jr. (eds), 4th edition, Oxford University Press, 2003; pp 3.224-3.234.
2. Glomerular Diseases. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp; 2334-2366.
3. Proliferative Glomerulonephritis. In: Oxford Textbook of Medicine, Warrell DA, Cox TM, Firth JD, Benz EJ Jr. (eds), 4th edition, Oxford University Press, 2003; pp 3.332-3.333.

ACUTE RENAL FAILURE (ARF)

A significant decline in the renal excretory function, mostly associated with oliguria (<500 ml/day), occurring over hours or days, detected clinically by a rise in plasma concentration of urea and creatinine.

Classification

1. Pre Renal Azotemia – due to poor renal perfusion.
2. Intrinsic Renal Disease
 - a) Acute tubular necrosis– Ischaemic/Nephrotoxic
 - b) Acute Glomerulonephritis – Immune complex mediated/Pauci immune/Anti GBM
 - c) Acute interstitial nephritis – Allergy/drug reaction/infection/CVD
3. Post Renal Azotemia - Obstruction of urinary tract.

Clinical features

- Uraemia - anorexia, nausea, vomiting, muscular cramps and signs of encephalopathy may appear later.
- For purposes of diagnosis and management, ARF is divided into three categories:
 - Pre-renal due to renal hypoperfusion (55%).
 - Renal due to disease which involve renal parenchyma (40%).
 - Post-renal due to diseases causing urinary obstruction.
- Complications of ARF include hyperkalaemia, intravascular volume overload, hyponatraemia, hypocalcaemia, hyperphosphataemia, metabolic acidosis, anaemia, coagulation abnormalities and infections; arrhythmias, pericardial effusion, pulmonary oedema, GI bleeding due to stress ulceration.

Treatment

Nutrition: Restrict dietary protein to 0.6 g/kg/day and carbohydrate to 100 g/day.

Prerenal ARF

1. Replacement fluids—tailored according to the composition of lost fluids, e.g. in haemorrhage blood transfusion/packed RBCs (if oliguria despite fluid correction).
Normal saline (0.9%) in case of burns, pancreatitis, diabetic ketoacidosis. Hypotonic saline (0.45%) if increased urinary or GI losses.
(Fluid intake = 500 ml + urine output + fluid loss from other sources)

2. Management of pulmonary oedema, if present.
3. In patients with cirrhosis complicated by ARF, fluids should be administered slowly and titrated against JVP. Large volume paracentesis should be accompanied by IV albumin.

Intrinsic renal ARF

Treatment depends upon the likely cause.

1. Acute glomerulonephritis, vasculitis—glucocorticosteroids, cyclophosphamide, and/or plasmapheresis.
2. Allergic interstitial nephritis—glucocorticoids.
3. Malignant hypertension, toxæmia of pregnancy—aggressive control of blood pressures.

Postrenal ARF

1. Suprapubic catheterization.
2. Referral to a urologist for removal of obstructing lesion.

Other essential measures.

1. Strict intake/output recording.
2. Monitor serum K^+ and acid-base status.
3. Reverse causative renal insult, e.g. restore haemodynamics, eliminate nephrotox-ins.
4. Prevention and treatment of complications.
5. Volume overload

Restrict salt (1-2 g/day—avoid all table/cooking salt and avoid food rich in sodium like milk) and water.

Inj. Frusemide IV dose depending upon extent of overload, usual dose is 40-200 mg/day as bolus or intravenous infusion.

Dialysis.

Hyponatraemia

1. Restrict free water intake (<1 liter/day).
2. Avoid hypotonic IV solutions.

Hyperkalaemia

1. Restrict dietary potassium (K^+) 40 mmol/d (no food containing K^+).
2. Inj. Glucose insulin drip—50 ml of 50% of dextrose with 10 units of plain insulin over 10 min.

And/Or

Inj. Sodium bicarbonate 50-100 ml of 4.2% IV 10 min.

And/Or

Inj. Calcium gluconate 10 ml of 10% solution over 5 min. (More than one step taken, if levels of serum $K^+ > 6.5$)

3. Cation exchange resins, e.g. Sodium or Calcium polystyrene sulphonate 15g orally 6 hourly.

Metabolic acidosis

1. Restrict dietary protein (0.6 g/kg/day).
2. Inj. Sodium bicarbonate IV to maintain an arterial pH of >7.2.

Hypocalcaemia

1. Tab. Calcium carbonate 1 g/day Or
IV Calcium gluconate 10% 10-20 ml given over 20 minutes (if tetany).

Hyperphosphataemia

1. Restrict dietary phosphate intake (<800 mg/day).
2. Calcium carbonate as above.

Hyperuricaemia

Treatment necessary only if uric acid is >10 mg %.

Tab. Allopurinol 100 mg three times a day

Dialysis is indicated for any of the following:

- Overt uraemia manifesting as encephalopathy, pericarditis, uraemic bleeding. Intractable fluid overload.
- Refractory hyperkalaemia.
- Rise in urea >150-180 mg% or creatinine >6-7 mg%. Severe acidosis producing circulatory compromise.

Doses of all essential drugs for the underlying disease should be adjusted according to the degree of renal impairment (See Appendix VII).

References

1. Acute Kidney Disease. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp; 2293-2308.
2. Acute Renal Failure. In: Oxford Textbook of Medicine, Warrell DA, Cox TM, Firth JD, Benz EJ Jr. (eds), 4th Edition, Oxford University Press, 2003; pp 3.248-3.262.

CHRONIC RENAL FAILURE (CRF)

Chronic kidney disease (CKD) is an irreversible, substantial and usually gradual loss of renal function leading to uraemia or GFR of less than 60 ml/min/ 1.73 m² for 3 months or longer with or without kidney damage. Causes are diabetes mellitus, hypertension, chronic glomerulonephritis, chronic pyelonephritis, analgesic nephropathy and polycystic disease.

Clinical Features

- Uraemia develop gradually and late.
- Fatigue, dyspnoea, anorexia, nausea, vomiting, ankle oedema, pruritis, purpura, and neuromuscular disturbances, nocturia.
- Examination - pallor, nail dystrophy, purpura, hypertension, cardiomegaly, CHF, features of pulmonary oedema, pleural effusion and pericarditis with or without effusion.

Investigations

- Fundus examination - hypertensive or diabetic retinopathy.
- Elevated blood urea and creatinine, hypocalcaemia, hyperphosphataemia, hyperkalaemia and a partially compensated metabolic acidosis.
- Peripheral smear shows a normocytic, normochromic anaemia
- urinalysis - proteinuria and low fixed specific gravity.
- On ultrasound - shrunken kidneys suggests ESRD.
- Kidney biopsy to be done if the kidneys are of normal size.
- Skeletal survey - renal osteodystrophy.

Treatment

Stage	Description	GFR (ml/min/1.73m ²)	Action
1	Kidney damage with normal or increased GFR	≥ 90	Diagnosis and treatment. Treatment of co-morbid Conditions Slowing of progression Cardiovascular disease risk reduction
2	Kidney damage with mildly decreased GFR	60-89	Estimating progression
3	Moderately decreased GFR	30-59	Evaluating and treating complications
4	Severely decreased GFR	15-29	Preparation of kidney replacement
5	End Stage Renal Disease	<15	Replacement(if uraemia is present)

1. Identification and management of associated factors precipitating acute or chronic renal failure, e.g. drugs, hypovolaemia, infections, obstructive uropathy, hypertension, CHF, pregnancy or presence of any life-threatening emergency, requiring urgent treatment, e.g. hyperkalaemia, pulmonary oedema, metabolic acidosis, uraemic encephalopathy or accelerated hypertension (Treat as mentioned under respective conditions).
2. Identification of specific cause of CRF and their treatment so as to delay the progress of CRF.
3. Modify loading and maintenance doses of drugs that are excreted through renal route.

Nonpharmacological

- Decrease protein intake to 0.6 g/kg/day of high quality protein.
- Phosphate restriction to 1000 g/day to reduce soft tissue calcification (avoid milk, egg, etc.).
- Moderate sodium restriction to 60 mmol/day (low salt during cooking and avoiding foods rich in sodium) to control BP and oedema.
- Potassium restriction, if CRF is moderate to severe (foods rich in K⁺ include banana, citrus fruits, coconut water, papaya, etc.)

- Fluid restriction is not generally necessary until late in renal failure.
- Sodium bicarbonate (baking powder) 600 mg 4 times a day, if plasma HCO_3^- is less than 20 mmol/liter.

Pharmacological

Control of hypertension, cardiovascular and pulmonary abnormalities

Target BP is 130/80-85 mmHg and in-patients with proteinuria >1 g/day, target BP is 125/75 mmHg (for details see section on hypertension).

The preferred drugs are:

Tab. Frusemide 40-160 mg per day.

Or

Tab. Amlodipine 5-20 mg per day.

And/Or

Tab. Atenolol 50-100 mg per day (contraindicated if concomitant cardiomyopathy with failure).

In diabetic nephropathy or CRF with proteinuria—ACE inhibitor/angiotensin receptor blocker with or without diuretic are preferred.

Treatment of pericarditis

Uraemic pericarditis is an absolute indication for initiation or intensification of dialysis. Heparin free dialysate should be used.

Treatment of anaemia

1. Look for common aggravating causes of anaemia, e.g. GI blood loss, iron deficiency and chronic infections and treat accordingly. Assess iron status of patient before erythropoietin (EPO) therapy.
2. Iron supplementation to ensure adequate response to EPO. (See section on Anaemia)
3. Inj. EPO subcutaneous 80-120 units/kg/week (divided into 2-3 times a week)

The target Hb should be 10-12 g/dl and optimal rate of correction should be to increase haematocrit by 4-6% over 4-week period.

Treatment of bleeding diathesis

Usually problem arises when a patient of CRF needs to undergo some surgery.

Inj. Vasopressin (DDAVP) 0.3 mcg/kg in 100 ml of saline in 30 min, to be administered before surgery.

Treatment of bone, phosphate and calcium abnormalities and acid base disturbances

1. Phosphate restricted diet.
2. Calcium carbonate – minimum of 1 g/day.
3. Vitamin D₃/Calcitriol – 0.25-2 mcg/day.

Maintain serum calcium at about 10 mg% and phosphate at about 4.5 mg%.

Treatment of hyperuricaemia (gout), if it is symptomatic

Tab. Allopurinol 100-200 mg/day preferably after food, then adjusted according to plasma or urinary uric acid concentration.

Absolute indications for dialysis

Fluid overload, severe hypertension, pericarditis, refractory hyperkalaemia, severe metabolic acidosis, encephalopathy and progressive neuropathy attributable to uraemia.

Renal replacement therapy (RRT)

Includes—haemodialysis, continuous ambulatory peritoneal dialysis or renal transplantation.

References

1. Chronic Kidney Disease. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp. 2308-2321.
2. Chronic Renal Failure. In: Oxford Textbook of Medicine, Warrell DA, Cox TM, Firth JD, Benz EJ Jr. (eds), 4th Edition, Oxford University Press, 2003; pp. 3.263-3.278.
3. Current Medical Diagnosis and Treatment 2015 Pg 900.

URINARY TRACT INFECTIONS (UTIs)

UTI is infection of any part of the urinary tract.

Clinical features

- Lower UTI - pain and burning during micturition, frequency of micturition, urgency, dysuria, pyuria, haematuria, acute cystitis with suprapubic pain or discomfort.
- Upper UTI - in addition to symptoms of lower UTI, these patients may have high fever, chills, rigours and pain in the loins, nausea and vomiting.

Investigations

- Urine—microscopic exam >10 pus cells/HPF and on culture bacterial growth, i.e. $>10^5/\text{mm}^3$ is diagnostic. The presence of bacteriuria of any degree in suprapubic aspirates or $>10^2/\text{mm}^3$ in urine obtained by catheterization indicates infection.
- Ultrasonography of the genitourinary tract and micturating cystourethrogram to detect underlying structural or functional abnormality.

Treatment

Nonpharmacological

Plenty of oral fluids.

Pharmacological

If symptoms are severe, antibiotics may be started empirically, after sending the urine samples. If symptoms are not severe, the antibiotics can be started as suggested by the culture and sensitivity report.

1. The specific treatment regimen is shown in Table 10.1.
2. Alkalinizing agents may be used with certain antibiotics like cotrimoxazole to prevent precipitation of crystals.
3. Tab. Pyridium up to 2 tablets 3 times a day for the first 2-3 days as a urinary analgesic to relieve dysuria.

Prophylaxis

Recommended to women who have two or more episodes of infection within 6 months or three or

more infections within one year.

Daily or thrice weekly administration of a single dose of Trimethoprim-sulfamethoxazole (TMP-SMZ) (80/400 mg), TMP alone (100 mg) or Nitrofurantoin (560 mg).

Table 10.1. Treatment regimen for bacterial urinary tract infections

Diagnosis	Antibiotic
Acute Pyelonephritis	IV Ampicillin 1 g every 6 hrs +gentamicin 1 mg/kg every 8 hrs for 14 days Ciprofloxacin orally 750 mg every 12 hrs for 7-14 days Ofloxacin orally 200-300 mg every 12 hrs for 7-14 days Trimethoprim-sulfamethoxazole 160/800 mg every 12 hrs for 10-14 days
Chronic Pyelonephritis	Same as acute pyelonephritis but duration of therapy is 3-6 months.
Acute Cystitis	Cephalexin orally 250-500 mg every 6 hrs for 1-3 days Nitrofurantoin oral (macrocrystals) 100 mg every 12 hrs for 7 days Ciprofloxacin orally 250-500 mg every 12 hrs for 1-3 days Norfloxacin orally 400 mg every 12 hrs for 1-3 days Ofloxacin orally 200 mg every 12 hrs for 1-3 days Trimethoprim-sulfamethoxazole 160/800 mg two tablets single dose
Acute bacterial prostatitis	Same as acute pyelonephritis for 21 days
Chronic bacterial prostatitis	Ciprofloxacin orally 250-500 mg every 12 hrs for 1-3 months Ofloxacin orally 200-400 mg every 12 hrs for 1-3 months Trimethoprim-sulfamethoxazole 160/800 mg every 12 hrs for 1-3 months
Acute epididymitis- sexually transmitted	Ceftriaxone IM 250 mg single dose plus Doxycycline 100 mg 12 hrly for 10 days
Acute epididymitis- Non-sexually transmitted	Same as Chronic bacterial prostatitis for 3 weeks

References

1. Urinary Tract Infections. In: Oxford Textbook of Medicine. Warrell DA, Cox TM, Firth JD, Benz EJ Jr. (eds), 4th edition, Oxford University Press, 2003; pp. 3.420-3.434.
2. Urinary Tract Infections, Pyelonephritis and Prostatitis. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp. 2387-2395.
3. Current Medical Diagnosis and treatment 2015 Pg 932.

HYPOTHYROIDISM

Hypothyroidism could be primary; common causes are autoimmune, and iatrogenic due to I^{131} , antithyroid or lithium treatment and thyroidectomy, or secondary to pituitary or hypothalamic disease.

Clinical Features

- Coarse dry skin, hoarse voice, facial puffiness, weight gain, cardiac enlargement and/or pericardial effusion, goiter with or without prolonged relaxation phase of deep tendon reflexes.
- Myxoedema coma - severe hypothyroidism with hypothermia, hypoventilation, hyponatraemia, hypoxia, hypercapnia and hypotension.

Diagnosis is confirmed by low serum free thyroxine (FT_3 and FT_4), serum TSH raised in thyroid types and low in supratyroid types. Thyroperoxidase (TPO) antibodies are present in 90-95% patients with autoimmune hypothyroidism.

Treatment

Pharmacological

If no residual thyroid function – daily replacement dose of Tab Levothyroxine 1.6 mg/kg body wt.

Adult patient without heart disease may be started on Tab. L-thyroxine 50-100 mcg/day. Dose to be adjusted based on TSH levels. Goal is normal TSH (lower half of reference range). Measure TSH levels after about 2 months of instituting therapy. Adjust by 12.5 or 25 mcg increments, if TSH is high; decrement of same, if TSH is suppressed.

Full replacement achieved then follow up measurement at annual intervals and later at 2-3 years interval. Ensure ongoing compliance.

Special treatment considerations

- Hypothyroid woman should be euthyroid prior to conception and during early pregnancy (affect on foetal neuronal development).
- Elderly require less thyroxine (less by up to 20%), especially those with coronary artery disease. Starting dose 12.5 mcg/day with similar increments every 2 to 3 months until TSH is normalized.

Myxoedema coma

1. Warm blankets, mechanical ventilation for respiratory failure.
2. Correction of metabolic disturbances and treat precipitating factors with broad spectrum antibiotics.
3. L-thyroxine 500 mcg IV bolus, then 50-100 mcg IV daily; if IV preparation not available, same dose via Ryle's tube. Once acute phase is over, maintain L-thyroxine as above.
4. Inj. Hydrocortisone 50 mg IV 6 hourly. (**Caution:** Avoid sedatives)

(For treatment of hypothyroidism in children, see in Chapter-19).

References

1. An Update on the Management of Hyperthyroidism and Hypothyroidism. Arch Intern Med 2000; 160: 1067-1071.
2. Disorders of the Thyroid Gland. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp. 2911-2939.
3. Disorders of the Thyroid Gland. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 19th Edition, McGraw Hill Company Inc., New York,; pp. 2292.

HYPERTHYROIDISM

Classically occurs in Graves' disease, which is characterized by diffuse goiter, ophthalmopathy and dermopathy in varying combinations. Other important causes are toxic multinodular goiter (TMN) and toxic adenomas.

Clinical Features

- Sweating, tremors, wide pulse pressure, sinus tachycardia and atrial arrhythmias;
- Worsening of angina or cardiac failure may predominate in older patients.
- Graves' disease—goiter, ophthalmopathy and dermopathy.

Diagnosis is confirmed by low to undetectable serum TSH and increased serum free thyroxine (FT₃) and free (FT₄).

Treatment

Pharmacological

1. Adjunctive treatment—for adrenergic symptoms like sweating, tremor and tachycardia.
Tab. Propranolol 40-120 mg a day.

Or

Tab. Atenolol 50-200 mg a day to be continued until patient becomes euthyroid.

2. Tab. Propylthiouracil 100-150 mg every 6-8 hours.

Or

Tab. Carbimazole 10-20 mg every 8-12 hours; after euthyroid state achieved in 6-8 weeks once daily dose possible.

Review with serum TSH and FT₃ after 4-6 weeks treatment has been initiated. Once controlled reduce to smallest effective dose or continue initial dose combined with L-thyroxine. Drugs are given for average of 2 years.

Definitive treatment is surgery/ablation of thyroid tissue (for details see thyroïdswelling in surgery section Chapter 18).

Surgery. Subtotal thyroidectomy in younger patients (<30 years) in whom antithyroid therapy has been unsuccessful and in very large goiters.

Radioactive iodine (I¹³¹). Method of choice in the elderly, younger patients (completed family) with recurrent thyrotoxicosis following surgery or when surgery is refused/ contraindicated. Risk of thyrotoxic crisis minimized by pretreatment with antithyroid drugs.

(Caution: Radioiodine should never be given in pregnancy. In women of child bearingage, if radioiodine treatment is planned, a pregnancy test must always be carried out).Antecedent treatment with antithyroid drugs should be considered with all elderly with cardiac problems to deplete thyroid hormone stores.

Pregnancy

In pregnant women, surgery should not be performed in the 1st and 3rd trimesters. Antithyroid drugs are less risky but may induce hypothyroidism in the foetus and should be used in the smallest necessary dose to keep serum TSH and FT₄ in normal range.

Propylthiouracil is preferred—usual maintenance dose is 200 mg/day. If >300 mg/ day required during 1st trimester, subtotal thyroidectomy indicated in the 2nd trimester. Propranolol should be avoided as it can cause foetal growth retardation and neonatal respiratory depression.

Ophthalmopathy

Refer to an ophthalmologist.

Initiate therapy in mild cases with elevation of the head at night, diuretics to decrease oedema, use of tinted sunglasses and 1% methylcellulose eyedrops to prevent drying and refer patients with severe and progressive exophthalmos to an ophthalmologist.

Toxic multinodular goiter

Radioactive iodine is the treatment of choice. Large doses are usually required. Treatment with antithyroid drugs given till patient is euthyroid.

Propranolol may be useful before and after radioactive iodine administration.

Thyrotoxic crisis or thyroid storm

Refer to a tertiary care.

Life-threatening exacerbation of hyperthyroidism with fever, vomiting, diarrhoea, jaundice, delirium and coma; usually precipitated by acute illness like stroke, infection, trauma, diabetic ketoacidosis, patients undergoing surgery or radioiodine treatment in a poorly prepared patient:

1. Tab. Propylthiouracil 500-1000 mg loading dose, then 250 mg every 4 hours orally or through Ryle's tube.
Or
Tab. Carbimazole 15-25 mg 6 hourly.
2. One hour after 1st dose of antithyroid drug, saturated solution of Potassium iodide (SSKI) 5 drops every 6 hours.
Or
Lugol's iodine 10 drops 3 times a day.
Or
Sodium iodide 0.25 g IV 6 hrly.
3. Tab. Propranolol 60-80 mg 4 hourly or 2 mg IV every 4 hours.
4. Inj. Hydrocortisone 300 mg IV bolus then 100 mg 8 hrly.
Once euthyroid status is achieved, manage as already outlined.

References

1. An Update on the Management of Hyperthyroidism and Hypothyroidism. Arch Intern Med 2000; 160: 1067-1071.
2. Disorders of the Thyroid Gland. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp. 2911-2939.
3. Disorders of the Thyroid Gland. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 19th Edition, McGraw Hill Company Inc., New York,; pp. 2292.

HYPOCALCAEMIA

Hypocalcaemia may be caused by hypoparathyroidism, pseudohypoparathyroidism, vitamin D deficiency states, chronic renal failure, malabsorption syndrome and hypomagnesaemia.

Clinical Features

Circumoral paraesthesias, muscle cramps, confusion, tetany, convulsions.

Positive Chvostek's and Trousseau's signs.

Investigations

- ECG may reveal prolongation of the QT interval.
- Total serum calcium <8.5 mg/dl (ionized calcium <4 mg/dl). In hypoalbuminaemia, add 1 mg/dl of calcium to the estimated level for every one gram fall of albumin below 4 g/dl (corrected serum calcium).

Treatment (severe symptomatic hypocalcaemia)

Calcium gluconate solution 20 ml of 10% over 10-15 min followed by 60-80 ml of 10% solution in 1 L 5% dextrose (0.5-2.0 mg/kg/h elemental Calcium).

(**Caution:** Should not be mixed with bicarbonate solution as it may result in precipitation of calcium carbonate).

Measure serum calcium every 4-6 h. Aim is to maintain the total serum calcium concentration at 7-9 mg/dl. Note that untreated hypomagnesaemia will often make hypocalcaemia refractory to therapy.

If associated with hypomagnesaemia, Inj. Magnesium sulphate 1-2 g IV on day 1 followed by oral Magnesium oxide 600-1200 mg 3 times a day to replenish stores.

Asymptomatic hypocalcaemia/Maintenance treatment

Treat the underlying cause, if possible. Usually long-term treatment required in conditions like hypoparathyroidism, pseudohypoparathyroidism, and chronic vitamin D deficiency states.

Tab. Calcium carbonate (40% elemental calcium by weight) 1-2 g elemental calcium orally 3 times a day initially and subsequently maintenance dose of 0.5-1 g 3 times a day.

In chronic renal failure, calcium alone gives an inadequate response.

However, correct concomitant hyperphosphataemia before instituting following therapy:

Vitamin D 50000 IU/day for 1-2 weeks, then weekly or bimonthly.

Or

Calcitriol 1,25(OH)₂D₃ 0.25 mcg orally daily—more expensive but less toxic than vitamin D

for hyperphosphataemia—advise low phosphate (low cereal) diet and phosphate binding agents, e.g. aluminium hydroxide.

References

1. Diseases of the Parathyroid Gland and Calcium Homeostasis. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp 3096-3120.
2. Calcium. In: The Washington Manual of Medical Therapeutics, Ahya SN, Flood K, Paranjothi S (eds), 30th Edition, Williams and Wilkins, Lippincott, Philadelphia. 2001; pp-60-66.
3. Life-threatening Electrolyte Abnormalities. Circulation 2005; 112: IV-121-IV-125.

HYPERCALCAEMIA

The common causes are hyperparathyroidism and malignancy; others include excessive vitamin D action, high bone turnover or renal failure. Hypercalcaemia is defined as 10.5 mEq/L (or an elevation in ionized calcium > 4.8 mg/dl).

Clinical Features

- Generally symptoms appear when serum Ca >11.5-12.0 mg/dl; severe hypercalcaemia (>15-18 mg/dl) can result in death.
- Fatigue, depression, confusion, anorexia, nausea, vomiting, constipation, polyuria, short QT interval on ECG and occasionally cardiac arrhythmias.

Treatment

Mild hypercalcaemia can be treated with rehydration only, while severe hypercalcaemia is treated as a medical emergency.

1. Rehydration infusion of 0.9% saline at 300-500 ml/h (saline diuresis) until fluid deficit is replaced and diuresis occurs (urine output \geq 200 to 300 ml/h). After rehydration has occurred, the saline infusion rate is reduced to 100 to 200 ml/h.
2. Monitor electrolytes especially potassium and magnesium and replace accordingly.
3. Haemodialysis is the treatment of choice to rapidly decrease serum calcium in patients with heart failure or renal failure. For extreme conditions, chelating agent (e.g. 50 mmol PO₄ over 8 to 12 hours or EDTA 10 to 15 mg/kg over 4 hours).
4. Tab. Phosphorus (sodium and potassium phosphate) 1-1.5 g per day in 4 divided doses for several days, when hypophosphataemia is present.

Definitive treatment, wherever possible, is parathyroidectomy in hyperparathyroidism.

References

1. Diseases of the Parathyroid Gland and Calcium Homeostasis In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp 3096-3120.
2. Calcium. In: The Washington Manual of Medical Therapeutics. Ahya SN, Flood K, Paranjothi S (eds), 30th Edition, Williams and Wilkins, Lippincott, Philadelphia. 2001; pp-60-66.
3. Life-threatening Electrolyte Abnormalities Circulation 2005; 112; IV-121– IV-125.

DIABETES MELLITUS

Diabetes Mellitus (DM) is a group of metabolic disorders characterized by hyperglycaemia. Several distinct types are caused by complex interaction of genetic & environmental factors.

Clinical Features

- Polyuria, polydipsia, polyphagia and unexplained weight loss
- *Random or casual plasma glucose ≥ 200 mg/dl or **fasting plasma glucose ≥ 126 mg/dl or 2 h plasma glucose ≥ 200 mg/dl after a 75 g glucose load.
- Impaired fasting glucose (IFG) 100-125 mg/dl and impaired glucose tolerance (IGT)-2 h plasma glucose 140-199 mg/dl are considered “pre-diabetes” and are risk factors for future diabetes and cardiovascular disease (CVD).

* Random/casual is defined as any time of day without regard to last meal

**Fasting is defined as no caloric intake for at least 8 hours.

Treatment of DM Type 1

Nonpharmacological

Principles of dietary therapy

- Carbohydrate 45-65% of total calories; Protein—10-35% of total Kcal/day (10% for those with nephropathy); 20-35% from fat: saturated fat $<7\%$ of total Kcal/day polyunsaturated fat 10% of Kcal/day. Intake of *trans*-fats should be minimized.
- *Low carbohydrate diets (<130 g/day) not recommended in the treatment of overweight/obesity. Routine supplementation with antioxidants (vitamins E, C and carotene) not advised.*
- Use of caloric sweeteners including sucrose is safe when consumed within the intake levels recommended by FDA.
- Fibre 20-35 g/day and sodium 3000 mg/day. Cholesterol 300 mg/day.

Pharmacological

Insulin therapy.

1. Therapy should be started with insulin (human) in a dose of 0.5 units/kg/day to 1.0 unit/kg/day.
2. Combination of regular + lente/semilente insulin should be used (now available as Premix preparation as well).
3. One-third of the total insulin requirement is given as regular and two-thirds as lente/semilente.
4. One-third of the total dose is used before dinner and two-thirds before breakfast.
5. Insulin is given SC 30-45 min before meals.
6. Medial aspect of thigh and abdominal wall are generally used for injection. Rotate injection site frequently. There is no need to use spirit swab, if the skin is clean.
7. Dose, type and timing of insulin is adjusted according to pre-prandial blood sugar levels (80-150 mg%). Level of blood glucose estimated depends on dose of plain insulin taken 3-

- 4 hours before or intermediate/long-acting insulin taken 8-12 hours before the test.
8. Increment of dose should not be more than 10% of existing dose and dose readjustment should not be made earlier than 3 days.
 9. Use of insulin analogs in select cases when it is justified on clinical grounds, preferably under guidance of a specialist. Patients must be properly trained for administration of SC injections.
 10. Meals must be ensured after injection.
 11. Explain features of hypoglycaemia to the patient (see section on Hypoglycaemia).
 12. Diabetes self-management and adjustment of Insulin dose based on self-monitoring of glucose and carbohydrate count.

Treatment of DM Type 2

Nonpharmacological

Diet. Basic principles of the diet are same as in DM Type 1. Most of the patients in DM type 2 are, however, obese and should be put on dietary restrictions for weight reduction as above.

Exercise. Regular physical exercise for 1/2 to 1 hour (for sedentary workers): at least 150 min/week of moderate-intensity aerobic physical activity (50-70% of maximum heart rate) and/or at least 90 min/week of vigorous aerobic exercise (>70% of maximum heart rate). At least for 3 days/week.

Pharmacological

Level of hyperglycaemia influences the initial choice of oral hypoglycaemic agents. Treatment may be started with any of the following drugs and dose individualized and dose can be increased every 2-3 weeks as determined by blood glucose response:

Tab. Metformin 500 mg once or twice a day in obese patients and increase the dose to 1000 mg 2 times a day with meals.

Or

Tab. Glimepiride 1-8 mg/day once daily to be taken at the same time every day with breakfast or Tab. Glipizide 2.5-40 mg/day before breakfast or Tab. Glipizide ER 5-10 mg/day with breakfast or Tab. Gliclazide MR 30 mg-120 mg/day as single dose at breakfast time.

(**Caution:** MR and ER tablets should be swallowed whole and not broken, chewed or crushed, as this would damage the modified release action)

Or

Tab. Glyburide (Glibenclamide) 1.25-20 mg/day administered with breakfast or with the first main meal.

Or

Tab. Pioglitazone initially 15-30 mg, up to 45 mg usually once daily without regard to meals.

Combination therapy. If monotherapy fails with oral hypoglycaemics at maximal tolerated doses as does not achieve or maintain A1C target over 3-6 months, add a second oral agent or GLP-1 receptor agonist or insulin. Following combination can be given, if inadequate glycaemic control with single oral hypoglycaemic agent:

Sulphonylurea + metformin

Sulphonylurea + pioglitazone

Sulphonylurea + alpha glucosidase inhibitor (Acarbose)

Insulin + metformin

Insulin may be required in patients with primary (markedly symptomatic and/ or elevated blood glucose levels or A1C) or secondary failure to oral agents; often as single dose of intermediate acting insulin 0.3-0.4 units/kg/day either before breakfast or at bedtime in combination with Tab. Metformin. Insulin is also required in situations like pregnancy, surgery, infection, etc.

Consider insulin as initial therapy in patients with:

1. Fasting plasma glucose >250-300 mg/dl since more rapid glycaemic control will reduce glucose toxicity to islet cells, improve insulin secretion and possibly make oral hypoglycaemic agents more effective.
2. Lean patients or those with severe weight loss.
3. Underlying renal or hepatic disease, or acutely ill or hospitalized patients.

Glycaemic goals

Glycaemic control is fundamental to the management of diabetes and glycaemic goals are shown in Table 11.1.

Table 11.1. Summary of recommendations on glycaemic goals for adults with diabetes

Glycaemic control	
A1C	<7.0%.
Preprandial capillary plasma glucose	90-130 mg/dl (5.0-7.2 mmol/L)
Peak postprandial capillary plasma glucose	<180 mg/dl (10.0 mmol/L)
Blood pressure	< 130/80 mmHg
Lipids	
LDL	<100 mg/dl (<2.6 mmol/L)
Triglycerides	<150 mg/dl (<1.7 mmol/L)
HDL	>40 mg/dl (> 1.0 mmol/L)
Key concepts in setting glycaemic goals:	
<ul style="list-style-type: none">• A1C is the primary target for glycaemic control• Goals should be individualized based on duration of diabetes, age/life expectancy, comorbid conditions, etc.• Certain populations (children, pregnant women, and elderly) require special considerations• More stringent glycaemic goals (i.e. a normal A1C, <6%) may further reduce complications at the cost of increased risk of hypoglycaemia• Less intensive glycaemic goals may be indicated in patients with severe or frequent hypoglycaemia• Postprandial glucose may be targeted, if A1C goals are not met despite reaching preprandial glucose goals	

PREVENTION AND MANAGEMENT OF DIABETES COMPLICATIONS

Cardiovascular disease (CVD)

1. Hypertension/blood pressure control- Patients with diabetes should be treated to a systolic blood pressure <140 mmHg and diastolic blood pressure <90 mmHg. (for details see section on Hypertension).

2. Dyslipidaemia/lipid management- In individuals without overt CVD

- The primary goal is an LDL < 89 mg/dl (2.6 mmol/l).
- For those over the age of 40 years, statin therapy to achieve an LDL reduction of 30-40% regardless of baseline LDL levels is recommended.
- For those under the age of 40 years but at increased risk due to other cardiovascular risk factors who do not achieve lipid goals with lifestyle modifications alone, the addition of pharmacological therapy is appropriate.
- In individuals with overt CVD
- All patients should be treated with a statin to achieve an LDL reduction of 30-40%.

Lower triglycerides to <150 mg/dl (1.7 mmol/l) and raise HDL cholesterol to >40 mg/dl (1.0 mmol/l). In women, an HDL goal 10 mg/dl higher (>50 mg/dl) should be considered.

Statin therapy is contraindicated in pregnancy.

3. Antiplatelet agents- Use aspirin therapy (75-162 mg/day) as a secondary prevention strategy in those with diabetes with a history of CVD.

Use aspirin therapy (75-162 mg/day) as a primary prevention strategy in those with:

- Type 1 and 2 diabetes at increased cardiovascular risk, including those who are >40 years of age or who have additional risk factors (family history of CVD, hypertension, smoking, dyslipidaemia, or albuminuria).

4. Smoking cessation

5. Coronary heart disease (CHD) screening and treatment - In patients >55 years of age, with or without hypertension but with another cardiovascular risk factor (history of CVD, dyslipidaemia, microalbuminuria, or smoking), an ACE inhibitor (if not contraindicated) should be considered to reduce the risk of cardiovascular events.

In patients with a prior myocardial infarction or in patients undergoing major surgery, β -blockers, in addition, should be considered to reduce mortality.

In asymptomatic patients, consider a risk factor evaluation to stratify patients by 10 year risk and treat risk factors accordingly.

6. Nephropathy screening and treatment

Screening

- Perform an annual test for the presence of microalbuminuria in type 1 diabetic patients with diabetes duration of ≥ 5 years and in all type 2 diabetic patients, starting at diagnosis and during pregnancy.
- Serum creatinine should be measured at least annually for the estimation of glomerular

filtration rate (GFR) in all adults with diabetes regardless of the degree of urine albumin excretion. The serum creatinine alone should not be used as a measure of kidney function but instead used to estimate GFR and stage the level of chronic kidney disease (CKD).

- For individuals with diabetic kidney disease dietary protein should be maintained at recommended daily allowance of 0.8 g/kg body weight per day. Reducing the amount is not recommended because it does not alter glycemic measures, cardiovascular risk measures or the rate at which GFR declines.

7. Retinopathy screening and treatment

Screening - Adults and adolescents with type 1 and 2 diabetes should have an initial dilated and comprehensive eye examination by an ophthalmologist or optometrist within 1-2 years after the onset of diabetes.

Treatment

- Laser therapy can reduce the risk of vision loss in patients with high-risk characteristics (HRCs).
- Promptly refer patients with any level of macular oedema, severe non-proliferative diabetic retinopathy (NPDR) or any PDR to an ophthalmologist.

8. Neuropathy screening and treatment

Recommendations

- All patients should be screened for distal symmetric polyneuropathy (DPN) at diagnosis and at least 1-2 times a year thereafter, using simple clinical tests.
- Once the diagnosis of DPN is established, special foot care is appropriate for insensate feet to decrease the risk of amputation.
- Simple inspection of insensate feet should be performed at 3- to 6-month intervals. An abnormality should trigger referral for special footwear, preventive specialist, or podiatric care.
- Screening for autonomic neuropathy should be instituted at diagnosis of type 2 diabetes and 5 years after the diagnosis of type-1 diabetes.

Diagnosis of neuropathy

Screened annually for DPN using tests such as pin-prick sensation, temperature and vibration perception (using a 128-Hz tuning fork), and 10 g monofilament pressure sensation at the distal plantar aspect of both great toes and ankle reflexes. Loss of 10 g monofilament perception and reduced vibration perception predict foot ulcers.

Diabetic autonomic neuropathy

Most patients will require pharmacological treatment for painful symptoms (Table 11.2).

Table 11.2 Drugs to treat symptomatic DPN

Class	Examples	Typical doses*
Tricyclic drugs	Amitriptyline	10-75 mg at bedtime
	Nortriptyline	25-75 mg at bedtime
	Imipramine	25-75 mg at bedtime
Anticonvulsants	Gabapentin	300-1,200 mg 3 times daily

Class	Examples	Typical doses*
	Carbamazepine	200-400 mg 3 times daily
	Pregabalin	100 mg 3 times daily
5-Hydroxytryptamine and norepinephrine uptake inhibitor	Duloxetine	60-120 mg daily
Substance P inhibitor	Capsaicin cream	0.025-0.075% applied 3-4 times daily

*Dose response may vary; initial doses need to be low and titrated up.

(See also diabetes mellitus in Chapter 19)

DIABETIC KETOACIDOSIS

Ketoacidosis is acute complication of diabetes, usually occurs in type 1 but can occur in type 2 and characterized by hyperglycaemia, hyperketonaemia and acidosis.

Clinical Features

- Nausea, vomiting, abdominal pain,
- Dehydration and altered sensorium.

Diagnosis is confirmed by demonstration of ketones in urine (or elevated levels in blood), hyperglycaemia, low arterial pH, low bicarbonate (>15 mmol/l) and high anion gap (>15 mmol/l).

Treatment

1. Confirm the diagnosis (increased plasma glucose, positive serum ketones, metabolic acidosis)
2. Admit to hospital ; intensive care setting necessary for frequent monitoring or if pH < 7 or unconscious.
3. Assess serum electrolytes (K^+ , Na^+ , Mg^{++} , Cl^- , bicarbonate, phosphates), acid base status (pH, HCO_3^- , pCO_2 , β hydroxybutyrate), Renal function (creatinine, urine output)
4. Replace fluids 2-3 L of 0.9% saline over first 1-3 hrs (10-20 ml/kg/hr) then 0.45% saline at 150-250 ml/hr when plasma glucose reaches 250 mg/dl.
5. Administer short acting insulin : IV (0.1 U/kg) then 0.1 U/kg/hr by continuous IV infusion ; increase 2-3 fold if no response by 2-4 hrs. If the initial serum $K^+ < 3.3$ mEq/L .Do not administer insulin until K^+ is corrected.
6. Assess patient : what precipitated the episode (non-compliance, infection, trauma, pregnancy, infarction, cocaine)? Initiate appropriate workup for precipitating event (cultures, chest X ray, ECG)
7. Measure capillary glucose every 1-2 hrs; measure electrolytes (especially K^+ , bicarbonate, PO_4^{--}) and anion gap every 4 hrs for first 24 hrs.
8. Monitor blood pressure, pulse, respiration, mental status, fluid intake & output every 1-4 hrs.
9. Replace $K^+ = 10$ mEq/hr when plasma $K^+ < 5.0-5.2$ mEq/L, ECG normal, urine flow and normal creatinine documented , administer 40-80 mEq/hr when plasma $K^+ < 3.5$ mEq/L or if bicarbonate is given. If initial serum K^+ is > 5.2 mmol/L do not supplement K^+ until K^+ is

(215)

corrected.

10. Continue above until patient is stable, glucose goal is 150-250 mg/dl and acidosis is resolved. Insulin infusion may be decreased to 0.05-0.1 U/kg/hr.
11. Administer long acting insulin as soon as patient is eating. Allow for a 2-4 hr overlap in insulin infusion and subcutaneous insulin injection.

(For complications of diabetes mellitus see also Diabetic Retinopathy in Chapter-13).

References

1. Executive Summary: Standards of Medical Care in Diabetes—2012. Diabetes Care 2012; 35 2001; (Suppl. 1).
2. American Diabetes Association: Clinical Practice Recommendations update 2016.
3. Diabetes Mellitus. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 19th Edition, McGraw Hill Company Inc., New York, 2012; pp. 2419..

NON-KETOTIC HYPEROSMOLAR COMA

It is characterized by profound dehydration due to sustained hyperglycaemic dehydration and hyperosmolality, usually seen in elderly patients with type 2 DM, associated with stroke or sepsis.

Clinical Features

- Severe dehydration, altered sensorium and marked hyperglycaemia.
- Features of venous thrombosis due to hyperviscosity.
- Focal neurological deficit and sepsis.

Diagnosis by finding very high blood glucose (>500-1000 mg/dl), high plasma osmolality, acidosis and azotaemia.

Treatment

1. Normal saline or half normal saline (0.45%) 2-3 liters rapidly infused over 2-3 hours. Administration of 0.45% normal saline is indicated, if serum sodium is >150 mEq/L.
2. Inj. Insulin (regular) 5 units/hour as IV infusion.
3. Potassium chloride and sodium bicarbonate infusion as per requirement and administered as in ketoacidosis.

HYPOGLYCAEMIA

Hypoglycaemia occurs due to increased utilization of glucose by the body (as during fasting, exercise or in alcoholics) or over dose of hypoglycaemic drug(s).

Clinical features

- Sympathetic - anxiety, sweating, palpitation, tremors;
- CNS - light headedness, confusion/altered sensorium, convulsions, focal neurological deficits, weakness, hunger or blurred vision. Prolonged hypoglycaemia may result in permanent neurological deficits.

Diagnosis confirmed by estimation of blood glucose (< 70 mg/dl) by glucometer/ diastix, etc.

Treatment

Immediate

1. If patient presents early signs and is conscious, oral glucose (15-20 g) preferred or sweets/biscuits/sweet drink, etc.
2. If unconscious diabetic patient on treatment and glucometer is not available, give Inj. Glucose (25-50%) 50-100 ml infused rapidly IV.

Or

Inj. Glucagon 1 mg IM or SC. If patient receiving long-acting insulin/oral hypoglycaemic agents, continue IV infusion of 5% glucose with regular monitoring of blood glucose hourly. Contraindicated in hypoglycaemia caused by sulphonylureas as glucagon stimulates insulin secretion.

Note: In case of doubt between hypoglycaemia and diabetic ketoacidosis, always choose to give 25% dextrose because hypoglycaemia can kill a patient whereas slight rise in glucose in diabetic ketoacidosis will not alter the prognosis of the patient.

After 15-20 minutes

Check blood glucose after 15-20 minutes and confirm recovery.

On recovery

- Identify cause and re-educate patient to avoid future episodes.
- If recovery is delayed or patient was on long-acting insulin or oral hypoglycaemic agents: Patient unconscious give infusion of 5-10% Dextrose Patient conscious give more oral glucose.

Note: Slow recovery from coma may be due to cerebral oedema, but may respond to IV mannitol and forced ventilation with high inspired oxygen concentration.

References

1. Executive Summary: Standards of Medical Care in Diabetes—2012. Diabetes Care 2012; 35 2001; (Suppl.
2. American Diabetes Association: Clinical Practice Recommendations update 2011.
3. Diabetes Mellitus. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp 2968-3003.

ERECTILE DYSFUNCTION

Important causes are psychogenic, diabetes mellitus, atherosclerosis and many drugs especially antihypertensives.

Investigations

- Complete blood picture,
- Plasma glucose and lipid profile,
- Serum prolactin, serum testosterone and plasma gonadotrophins
- Vascular testing or psychological tests

Treatment

Vacuum constriction devices

Surgery, e.g. surgical implant of semirigid or inflatable penile prosthesis.

Pharmacological

Tab. Sildenafil 25-100 mg; the onset of action is within 60-90 minutes.

Lower initial doses in the elderly, in renal insufficiency, or patients on drugs like erythromycin, cimetidine and ketoconazole which may increase the serum concentration.

(**Caution:** Contraindicated with concomitant nitrate therapy, congestive heart failure and cardiomyopathy; cautious use in coronary artery disease, borderline hypotension, hypovolaemia and patients on complex antihypertensive treatment).

Or

Inj. Testosterone enanthate 100-200 mg IM every 1-2 weeks in low testosterone states.

Or

Intraurethral Alprostadil (Prostaglandin E₁) semisolid pellets of 125-1000 mcg. Or

Intracavernosal Alprostadil self-injection 1-40 mcg.

Reference

1. Sexual Dysfunction. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp 374-380.

ACUTE SUPPURATIVE OTITIS MEDIA (ASOM)

ASOM is caused by inflammation of the mucous membrane lining the middle ear cleft (consisting of the eustachian tube, tympanic cavity, mastoid antrum and mastoid air cells) produced by pus forming organisms.

Clinical Features

- Severe throbbing pain in the ear, difficulty in hearing, and rarely giddiness and excessive crying in children.
- Often bilateral in children, preceded by upper respiratory tract infection.
- Congestion and bulging of ear drum leading to perforation and discharge.

Treatment

Nonpharmacological

Steam inhalation and to keep the ear clean in case of pus discharge.

Pharmacological

1. For fever Tab. Paracetamol 500 mg SOS (for details see section on fever in chapter 1).
2. Cap. Amoxycillin 250-500 mg 8 hourly for 7 days. In complicated cases and children <2 years longer course i.e., 10 days is given.

In Children 20-40mg/kg in 3 divided doses for 7 days.

Or

Cap. Cephalexin 250-500 mg 8 hourly.

In Children 20-40mg/kg/day in 3 divided doses.

Switch antibiotics if no clinical improvement by 3rd day.

Or

Cap. Amoxicillin plus Clavulanic acid 625mg 12 hourly, in children 2-6 years 375mg 12 hourly, for children <2 years Suspension 5ml 12 hourly.

3. Xylometazoline HCl 0.1% 1-2 nasal drops in each nostril 1-2 times daily.

In Children (0.05%) 1-2 nasal drops 1-2 times daily.

Or

Oxymetazoline 0.05% 1-2 nasal drops in each nostril 2 times daily.

In Children (0.01%) 1-2 drops 2 times daily.

Surgical Treatment

Refer to an Otolaryngologist if there is intense pain, bulging of the ear drum or persisting fever

despite treatment for myringotomy.

References

1. Acute Suppurative Otitis Media and Acute Mastoiditis. In: Scott Brown's Otolaryngology, Vol 3, J B Booth (ed) 6th Edition, pp 3/9/1-15.
2. Acute Otitis Media in Adults. In: LoganTurner's Diseases of the Nose, Throat and Ear 10th Edition, pp 280-281.
3. Diseases of the Middle Ear Cleft. In: A Synopsis of Otolaryngology, 4th Edition, pp91-109.

CHRONIC SUPPURATIVE OTITIS MEDIA (CSOM) (TVBO-TYMPANICTYPE)

CSOM is characterized by the presence of a central perforation resulting from acute otitis media. Active disease- infection through the nasopharynx or through the perforation thus causing ear discharge. Inactive disease - deafness.

Clinical Features

- Discharge-mucoid, intermittent, copious during acute exacerbation.
- Deafness-usually conductive type.

Treatment

Nonpharmacological

Aural toilet by dry mopping or careful suction.

Pharmacological

Topical antibiotics:

1. Ciprofloxacin HCl 0.3% w/v ear drops 2-3 drops 3-4 times daily
2. When ear infection is associated with marked inflammation combine with Prednisolone 0.5%+ Chloramphenicol 5%+ Lignocaine 2% +Acetic acid 2% to be used as 3-4 drops 3-4 times daily.
3. In case of profuse mucopurulent discharge and for any associated upper respiratory tract infection give systemic antibiotics Cap. Amoxycillin 750-1500 mg in 3 divided doses
In Children 20-40 mg/kg in 3 divided doses.
The choice of antibiotic depends on the culture and sensitivity report of the pus.
4. Tab. Cetirizine 10mg once daily, in children suspension 5ml.

If patient has persistent foul smelling discharge in spite of treatment with headache and vomiting and vertigo, immediately refer the patient to otorhinolaryngologist for further treatment as patient may have unsafe CSOM with complications.

Surgical Treatment

Once the ear is dry and any local nidus of infection has been treated the ear can be taken up for myringoplasty after assessing the hearing status.

References

1. Diseases of the External Ear. In: LoganTurner's Diseases of the Nose, Throat and ear 10th Edition, pp

271-273.

2. Management of Chronic Suppurative Otitis Media. In: Scott Brown's Otolaryngology, 18 Boothy (ed), Vol 3, 6th Edition, 1997, pp3/10/1-11.

OTITIS MEDIA WITH EFFUSION

It is characterized by the presence of non-purulent fluid in middle ear cleft which may be because of Eustachian tube dysfunction, unresolved otitis media or allergy.

Clinical features

- Deafness— conductive type and tinnitus.
- Otoscopy may show retraction of the drum or air fluid level and air bubbles behind the drum.

Treatment

Pharmacological

1. Cap. Amoxycillin (as trihydrate 250mg) with Clavulanic acid(as pot. Salt) 375 mg, 1 Tab.thrice daily before meals for upto 21days.
2. Tab. Psuedoephedrine 120 mg 8 hourly.
In Children 1- 2mg/kg twice daily.
3. Nasal drops Xylometazolin for topical use.

Surgical

Surgical measures maybe necessary if patients do not respond to longterm pharmacological measures. Surgery may include myringotomy with or without grommet insertion, adenoidectomy, treatment for sinusitis and even mastoidotomy in refractory cases.

References

1. Management of Chronic Otitis Media. In: Scott Brown's Otolaryngology, JB Booth(ed), Vol. 3, 6th Edition, 1997, Butterworth-Heinemann, pp3/9/1-15.

WAX

Wax (cerumen) is a mixture of the secretions of the ceruminous and pilosebaceous glands located in the cartilaginous portion of the external auditory canal.

Clinical Features

- Pain, deafness, tinnitus, vertigo and reflex cough.

Treatment

Pharmacological

1. If pain is severe Tab.Ibuprofen 400mg SOS.
In Children 20mg/kg/day divided into 3 doses.
2. Wax softener -(Turpentine oil- 15%, Benzocaine -2.7%), Chlorbutol -5%, Paradichlorobenzene -2%) 3-4 days before cleaning the ear when the wax is hard.

Followed by surgical removal (to be carried out by an Otolaryngologist). Syringing with sterile saline solution at body temperature pushed along the posterior wall of the meatus to take out the wax. The meatus should be mopped dry after syringing.

(**Caution:** if there is previous history of ear discharge or perforated drum).

Or

Instrumental manipulation with ring probe, hook or forceps and suction cleaning.

Reference

1. Diseases of the External Ear. In: Logan Turner's Diseases of the Nose, Throat and Ear, 10th Edition, pp265-267

OTOMYCOSIS

It is fungal infection commonly by *Aspergillus niger* and *Candida albicans*.

Clinical Features

- Itching with or without pain,
- Grayish-white fungal debris with or without black specks
- Earblockage.

Treatment

Nonpharmacological

Regular ear toilet- by suction/dry mopping/instrumentation.

Pharmacological

1. Topical Clotrimazole as 1% powder or liquid 3-4 times a day to be continued for at least a week after clinical resolution of the infection.
2. Tab. Ibuprofen 400 mg as and when required.
In Children 20 mg/kg/day in 3 divided doses.

Or

Tab. Nimesulide 100 mg as and when required.

References

1. Diseases of the External Ear. In: Logan Turner's Diseases of the Nose, Throat and Ear, 10th Edition, pp274-275.
2. External Auditory Meatus. In: Scott-Brown's Otolaryngology, J B Booth (ed) Vol3, 6th Edition, 1997, Butterworth-Heinemann, pp3/6/14-15.

EXTERNAL EAR FURUNCULOSIS

It is due to staphylococcal infection of hair follicle in the outer cartilaginous part of the external meatus. Maybe single or multiple.

Clinical Features

- Pain, tenderness, swelling, ear blockade.
- Regional lymphadenitis and sometimes discharge.

Treatment

Nonpharmacological

Local heat.

Pharmacological

1. 10% Ichthamol in glycerine wickpack.

Or

Antibiotic steroid cream wickpack (Polymyxin B sulphate 500IU, Neomycin sulphate 3400 IU, Zinc bacitracin 400 IU, Hydrocortisone 10mg, per g) wickpacking to be done on alternate day till swelling subsides followed by/or

2. Local ear drops (Polymyxin B sulphate 1000U, Neomycin sulphate 3400 U, Hydrocortisone 10mg/ml).
3. Systemic therapy with antibiotics (see section on furunculosis in chapter 14 on skin diseases)
4. Tab. Ibuprofen 400 mg as and when required.

Or

Tab. Nimesulide 100mg twice a day.

Incision and drainage maybe necessary in some patients.

COMMON COLD (CORYZA)

This is one of the most common acute viral infections affecting upper respiratory tract.

Clinical features

Rhinorrhoea, nasal obstruction, malaise and fever.

Treatment

Nonpharmacological

Steam inhalation via nose 2-3 times/day for 2-3 days; rest; home remedies (ginger, tulsi, honey).

Pharmacological

1. Tab. Chlorpheniramine 4 mg 8 hourly for 5-7 days.
In Children 0.35mg/kg/day divided in 3 equal doses.

Or

Tab. Pheniramine maleate 25mg 2-3 times daily for 5-7 days.

In Children 0.5mg/kg/day divided in 3 equal doses.

Or

Tab. Cetirizine dihydrochloride 10 mg once a day 5-7 days.

In Children 5mg once a day.

2. If patient has malaise and fever:

Tab. Paracetamol 500 mg 3-4 times a day for 2-3 days and then as and when required.
In Children 40-60mg/kg/day divided in 4 doses or 10mg/kg/dose as and when required.

3. If nasal obstruction or rhinorrhoea is profuse:

Saline nasaldrops, 1-2 drops in each nostril 2-3 times daily.

4. If nasal obstruction is severe.

Ephedrine 0.75% nasal drops, 1-2 drops in each nostril 3 times a day for 2-3 days.

In Children 0.5% nasal drops, 1-2 drops in each nostril 2-3 times daily

Or

Oxymetazoline HCl 0.05% nasal drops, 1-2 drops in each nostril 2 times a day for 2-3 days.

In Children 0.025%, 1 drop, 2 times daily.

Or

Xylometazoline 0.1%, 1-2 drops in each nostril 2 times a day for 2-3 days.

In Children 0.05%, 1-2 drops, 1-2 times daily.

(**Caution:** Not recommended in children below 6 years of age) Medicated nasal drops should NOT be used for more than 7 days.

Reference

1. Acute Rhinosinusitis. In: Logan Turner's Disease of the Nose, Throat and Ear. 10th Edition, pp34

ALLERGIC RHINITIS

This is an IgE mediated hypersensitivity of mucous membrane of the nasal passage.

Clinical Features

- Sneezing, itching, watery nasal discharge and a feeling of nasal obstruction.
- Maybe associated with allergic conjunctivitis and bronchial asthma.
- Seasonal allergic rhinitis (SAR) (Hay fever)-sneezing, itching watery rhinorrhoea and conjunctivitis are prominent symptoms.
- Perennial allergic rhinitis (PAR)- nasal discharge is more viscous or purulent, nasal blockage, postnasal discharge and hyposmia.

Diagnosis –if patient is having two or more symptoms (viz. sneezing/itching, nasal discharge and nasal blockage) occurring for more than one hour on most days.

Treatment

Nonpharmacological

Avoid allergens.

Pharmacological

1. Tab. Cetirizine 10-20 mg in a single daily dose for 7 days In Children 5mg in a single daily dose.

Or

Tab.Chlorpheniramine maleate 4 mg 6-8 hourly for 7 days.

In Children 1-2years 1mg twice daily; 2-5 years 1mg every 3-6 hours;

6-12 years 2mg every 4-6 hours.

(**Caution:** Not recommended for children under 1 year)

Or

Tab.Pheniramine maleate 25-50 mg 8 hourly for 7 days.

In Children 0.5mg/kg/day divided in 3 doses.

The duration of treatment may need to be extended depending upon the response of the patient.

2. If nasal obstruction and rhinorrhoea,

Normal saline nasal drops 1-2 drops in each nostril 2 times daily.

Or

Xylometazoline 0.1% nasal drops 1-2 drops 2-3 times daily for 5-7days.

In Children 0.05% 1-2 drops 2 times daily.

Or

Oxymetazoline 0.5% nasal drops 2-3 drops 2-3 times daily for 5-7 days.

In Children 0.025% 1-2 drops 2 times in each nostril

3. In case signs and symptoms are persistent

Betamethasone nasal drops 2-3 drops 2-3 times a day.

Or

Hydrocortisone nasal drops 2-3 drops 2-3times a day.

Or

Beclomethasone inhaler (50mcg/puff) 2 puffs 12 hourly.

Or

Budesonide (50-100 mcg/puff) 1-2 puffs a day.

Or

Fluticasone 150mcg/puff 1-2 puffs a day.

Or

Topical Azelastine intranasal spray 2-3 times a day.

4. In case of no response to the treatment outlined above,

Tab. Prednisolone 5-60 mg/day in 3-4 divided doses for 5-7 days.

Or

Tab.Dexamethasone 0.5-5.0 mg/day in 3-4 divided doses for 5-7days.

Or

Tab.Betamethasone 0.5-5.0 mg/day in 3-4 divided doses for 5-7days.

5. Tab. Ranitidine 150mg 12 hourly,
Or
Tab. Omeprazole 20mg once daily empty stomach.

Reference

1. Mechanism and Treatment of Allergic Rhinitis. In: Scott Brown's Otolaryngology. J B Booth (ed), 6th Edition, 1997. Butterworth-Heinemann, pp4/6/1-16.

FURUNCULOSIS OF NOSE (VESTIBULITIS)

Furunculosis is an acute infection of hair follicle with *Staphylococcus aureus*.

Clinical Features

- Severe pain and tenderness over the tip of nose.
- Headache, malaise and pyrexia.
- Examination reveals congestion and swelling of the vestibule.

Treatment

Nonpharmacological

Local application of ice cold fomentation will enhance the localization of infection and promote drainage.

Pharmacological

1. Cap. Amoxycillin 500 mg 8 hourly for 5-7 days.
In Children 25-50 mg/kg/day in 3 divided doses.
Or
Cap. Amoxycillin 250mg + Cloxacillin 250mg 8 hourly for 5-7 days.
In Children 25-50mg/kg/day in 3 divided doses.
Or
Cap. Amoxycillin 250/500mg + Clavulanic acid 125mg 12 hourly for 5-7 days.
2. Tab. Ibuprofen 400-600 mg 3 times a day for 5 days.
In Children 10mg/kg/dose.
Or
Tab. Paracetamol 500 mg 6 hourly for 2-3 days then as and when required till pain and fever subsides.
In Children 10mg/kg 6-8 hourly
Or
Tab. Chymotrypsin 8 hourly.

Reference

1. Diseases of the External Nose and Nasal Vestibule. In: Diseases of Ear, Nose and Throat, PL Dhingra's (ed), 2nd Edition, pp 144.

EPISTAXIS

The most important causes of epistaxis includes trauma in the form of nose-picking; hypertension, bleeding disorders, nasal mass and acute inflammation.

Clinical Features

- Bleeding from the nose and mouth.
- Shock due to excessive loss of blood.

Treatment

1. Active epistaxis- Check the vitals and pinch the nose (apply firm pressure below the nasal bone) then wait for 15 minutes and again check nose for bleeding. If bleeding does not stop refer to an Otolaryngologist for nasal cautery. Patient should be admitted in the hospital for nasal cautery. If nasal cautery is not able to stop bleeding do nasal packing (anterior, posterior, merocel). If bleeding is controlled start antibiotics and remove the pack after 48 hours. If bleeding not controlled arterial ligation, angiography and embolization may be required.
2. Simultaneously treat the underlying cause.

Recurrent epistaxis

Identify the cause and treat accordingly.

Reference

1. Epistaxis. In: Scott Brown's Otolaryngology, IS MacKay and TR Bull (eds) Vd 4, 6th Edition, 1997, London: Butterworths, pp4118/1-19.

ACUTE RHINOSINUSITIS

This condition often occurs due to secondary bacterial infection after viral rhinitis.

Clinical Features

- Headache, facial pain, nasal obstruction, hawking and postnasal drip.
- Examination - congested nasal mucosa, pus in the middle meatus and tenderness over sinuses.

Treatment

Nonpharmacological

Steam inhalation via nose 2-3 times/day for 2-3 days; rest.

Pharmacological

1. Tab. Paracetamol 500mg 3-4 times a day for 5 days.
In Children 10mg/kg/dose.

Or

Tab. Ibuprofen 400mg-600mg 3 times a day for 5 days.
In Children 10mg/kg/dose.

2. Cap.Amoxycillin 500mg 8 hourly for 5-7 days.
In Children 50mg/kg/day in 3 divided doses.

Or

Tab. Ciprofloxacin 250-500 mg twice a day for 5-7 days.

(**Caution:** not recommended in children)

In sinusitis of dental origin

1. Cap.Amoxycillin 500mg 3 times a day for 5-7 days.
2. Tab.Metronidazole 400mg 3 times a day for 5-7 days.

Or

Tab.Ciprofloxacin 500mg 2 times a day for 5-7 days.

Tab.Tinidazole 600mg 2 times a day for 5-7 days.

3. Tab.Bromhexine 8 mg 3 times a day for 7 days.
4. If nasal obstruction orrhinorrhoea,
Normal saline nasal 1-2 drops in each nostril 2-3times a day.

Or

Ephedrine 0.75% nasal drops in isotonic saline 1-2 drops in each nostril 2 times a day;

In Children 0.5% 1-2 drops in each nostril 2 times daily.

Or

Oxymetazoline HCl 0.05% nasal drops. 1-2 drops in each nostril 2 times a day.

In Children 0.025% 1-2 drops in each nostril 2 times daily.

Or

Xylometazoline 0.1% nasal drops 2-3 drops in each nostril 2-3 times a day.

In Children 0.05% 1-2 drops in each nostril 1-2 times daily.

(**Caution:** Medicated nasal drops should not be used for more than 7 days).

Reference

1. Acute Rhinosinusitis. In: Logan Turner's Diseases of Nose, Throat and Ear. 10th Edition pp 34-36.

ACUTE TONSILLITIS

It is the acute inflammation of the palatine tonsils, generally bacterial in aetiology.

- Pain in the throat aggravated on swallowing and congestion over the tonsils and the anterior pillars.
- Fever and malaise.
- Enlarged and tender jugulodigastric lymphnodes.

Treatment

Nonpharmacological

Plenty of oral fluids and rest and warm saline gargles.

Pharmacological

1. Cap..Amoxycillin 500mg 3 times a day.
In Children 50mg/kg/day in 3 divided doses for 7 days.
Or
Cap. Erythromycin 500mg four times a day.
In Children 50mg/kg/day in three divided doses for 7 days.
3. Tab. Paracetamol 8-10 mg/kg 6-8 hourly and then as and when required, till fever subsides.
Or
Tab .Nimesulide 1.5-2 mg/kg/day and then as and when required, till fever subsides in adults.

If patient has grayish white membrane over tonsils with cervical lymphadenopathy with toxic look refer to paediatrician as patient might have diphtheria.

Reference

1. Acute and Chronic Tonsillitis. In: Diseases of Ear Nose and Throat, Dhingra PL (ed), 2nd Edition 1998.

ACUTE PAROTITIS

It is an acute bacterial infection of the parotid gland.

Clinical Features

- Swelling at the angle of mandible pushing ear lobule laterally, generally unilateral,
- Induration and tenderness of gland.
- Purulent saliva expressed from the duct opposite the upper second molar.

Treatment

Nonpharmacological

Adequate hydration, good oral hygiene, repeated massage of gland.

Pharmacological

1. Cap.Cloxacillin 20-40mg/kg in 3 divided doses for 7 days.
Or
Tab.Ciprofloxacin 500mg twice daily for 7 days in adults.
2. Tab. Paracetamol 8-10mg/kg thrice daily for 3 days and then as and when required, if pain and fever persists.
Or
Tab. Nimesulide 1.5-2mg/kg twice daily for 3 days in adults and then as and when required, if pain and fever persists.
3. Antiseptic mouthwash containing (Providone Iodine 1% or Chloroxylonol 1.02%, Menthol 0.12%, Absolute Alcohol 60.8%) to be used 3 times a day. in case parotitis is not responding, and there is increasing swelling over the parotid region or development of

induration over the gland, it may require incision and drainage. This should be done by an Otolaryngologist in a direction parallel to the direction of the facial nerve.

Reference

1. Non Neoplastic Diseases of Salivary Glands. In: Diseases of Ear Nose and Throat Dhingra PL (ed) 2nd Edition, 1998.

FACIAL PARALYSIS

The VII cranial nerve is frequently affected in diseases of the ear.

Central causes (upper motor neuron type)

- Brainstem infarction,
- Tumours
- Multiple sclerosis.

Peripheral causes (lower motor neuron type)-

- Inflammatory- AS OM, CSOM or herpes zoster,
- Traumatic -accidental/iatrogenic
- Neoplastic
- Idiopathic - in Bell's palsy or Melkersson's syndrome
- Systemic diseases - diabetes mellitus, sarcoidosis and demyelinating diseases etc.

Treatment

Nonpharmacological

Treat the underlying cause of the lesion. Surgical intervention is often indicated in peripheral causes like ASOM, CSOM and tumours.

Pharmacological

(Idiopathic paralysis of the Facial Nerve -Bell's palsy)

1. Tab. Prednisolone 2mg/kg/day in single or two divided doses for 1 week (maximum: 60mg/day) .Review after one week.
2. Tab. Ranitidine 150mg 12 hourly,

Or

Tab. Omeprazole 20mg once daily empty stomach.

If clinical improvement is present, taper steroids over 4-5 days. If no clinical improvement: continue for another week before tapering the dose. If recovery does not occur: surgical intervention maybe required.

Reference

1. Facial Nerve and its Disorders. In: Diseases of the Ear, Nose and Throat. PL Dhingra (ed), 2nd Edition, 1998, pp 95-105.

STYE (HORDEOLUM EXTERNUM)

Acute suppurative inflammation of lash follicle and its associated glands of Zeis or Moll caused by *Staphylococcus aureus* presenting as painful swelling at the base of cilia.

Treatment

Nonpharmacological

Hot fomentation and epilation of infected cilia 2-3 on either side.

Surgical treatment

Nick the pustule using sharp tip of a needle and blade and express the purulent material. Do not attempt squeezing.

Pharmacological

- Topical antibiotics:
Gentamicin 0.3% eyedrops 1 drop 6 hourly.
Or
Ciprofloxacin 0.3% eyedrops 6 hourly.
Or
Ciprofloxacin eye ointment 0.3% 2 times a day.
- Systemic antibiotics, if excessive oedema or cellulitis.
Tab. Roxithromycin 150 mg 2 times a day for 5-7 days.
Or
Cap. Amoxycillin 250-500 mg every 8 hours for 5-7 days.
- Tab. Ibuprofen 400 mg 3 times a day after meals.
- Exclude refractive error and diabetes mellitus and chronic blepharitis in recurrent cases.

Reference

- 1 Lid Inflammations. In: Principles and Practice of Ophthalmology. Albert and Jakobiec Azar Blodi (eds), 3rd edition, WB Saunders Co, 2008; pp. 625-635.

CHALAZION

It is a chronic inflammatory lipogranuloma of Meibomian glands presenting as solitary or multiple nodular swelling of tarsal plate.

Treatment

Nonpharmacological

Warm compresses for 4 weeks may relieve small chalazia of short duration.

Pharmacological

Tiny chalazia may be ignored.

Topical antibiotic as above.

Surgical treatment

For small chalazia, intralesional Triamcinolone (40 mg/ml)—inject 0.05 to 0.2 ml from the conjunctival side after local anaesthesia or from skin side. Repeated after 2-4 weeks, if no resolution.

For large chalazia (>6 mm) or those who present for more than 3-4 months duration, incision and curettage.

Recurrent and hard chalazia in elderly—excisional biopsy.

Reference

- 1 Lid Inflammations. In: Principles and Practice of Ophthalmology. Albert and Jakobiec Azar Blodi (eds), 3rd edition, WB Saunders Co, 2008; pp. 625-635.

VITAMIN A DEFICIENCY (XEROPHTHALMIA)

Xerophthalmia is characterized by night blindness, epithelial conjunctival xerosis, Bitot's spots and, keratomalacia and fundus changes in severe cases.

Treatment

Pharmacological

- (a) Cap of Vitamin A (Vitamin A) should be administered immediately on diagnosis:
 - **<6 months of age:** Three doses of oral Vitamin A 50,000 IU each immediately on diagnosis, the next day and at least 2 weeks later.
 - **6-12 months of age:** Three doses of oral Vitamin A 100,000 IU immediately on diagnosis, the next day and at least two weeks later.
 - **>12 months of age:** Three doses of oral Vitamin A 200,000 IU each immediately on diagnosis, the next day and at least 2 weeks later. Women of reproductive age with night blindness or Bitot's spots: <10,000 IU Vitamin A daily or weekly dose of < 25,000 IU.

Women of reproductive age whether or not pregnant with severe signs of active xerophthalmia (acute corneal lesions): Three doses of oral Vitamin A 200,000 IU each immediately on diagnosis, the next day and at least 2 weeks later.

Water miscible Vitamin A preparation (dose is half of oral dose) is given IM for children suffering from persistent vomiting, severe diarrhoea and intestinal parasites. If there is gross purulent discharge due to bacterial superinfection in keratomalacia.

- Gentamicin/Tobramycin eyedrops 14 mg/ml drops hourly.
- Cefazolin 50 mg/ml eyedrops 1 hourly till infection resolves.

- Tear substitutes /surface lubricants - Sodium carboxymethyl cellulose 5mg suspension; Polyvinyl Alcohol 14mg /ml ; carboxymethyl cellulose 0.5% ; Hydroxypropyle methylecellulose eyedrop 1-2% etc 6-8 times/day .
- Antiglaucoma medications - oral Acetazolamide 10-15 mg per kg body weight in divided dosage or topical Timololol 0.5% /Betoxolol .5% BD

If corneal ulcer present (see section on Corneal Ulcer).

Reference

1. Nutritional Blindness. In: Principles and Practice of Ophthalmology Vol 1-6, 3rd Edition, WB Saunders Co., 2008; pp. 4579-4585.
2. Management of corneal thinning melting and perforation In Text book of ophthalmology Myron Yanoff and Jay S Duker 4th Edition; Mosby imprint by Elsevier 2013 ;page325

RED EYE

This is a common condition. It is divided into non-painful and painful red eye.

NON-PAINFUL RED EYE

Causes

- Conjunctivitis,
- Lid abnormalities, e.g. Trichiasis, entropion, blepharitis, meibomitis, ectropion, lagophthalmos, molluscum contagiosum,
- Episcleritis,
- Subconjunctival haemorrhage,
- Inflamed pinguecula and pterygium.
- Primary angle closure glaucoma, phacomorphic glaucoma,
- Corneal ulcer/keratitis,
- Acute anterior uveitis, scleritis and endophthalmitis

Conjunctivitis

I. Infective Conjunctivitis

A. Bacterial conjunctivitis :

Acute mucopurulent, purulent, angular and membranous conjunctivitis.

Acute mucopurulent conjunctivitis : Commonly caused by *Staphylococcus aureus*, *Haemophilus ae-gyptius* (Koch-Week's bacillus), *Streptococcus pneumoniae*, *Streptococcus viridans* and *pyogenes*.

Clinical Features

- Unilateral or bilateral red eye, conjunctival congestion,
- Mucopurulent or purulent discharge, stickiness of eyelids, matting of cilia;

- Cornea, pupil and visual acuity are normal
- Corneal involvement—pain, photophobia and circumcorneal congestion.

Nonpharmacological treatment

- Do not patch or bandage the eye; use dark glasses to prevent photophobia;
- Clean the eye with plain water 3-4 times a day or irrigate conjunctiva with sterile normal saline or Ringer's lactate twice a day.

Pharmacological

1. Eyedrops Gentamicin 0.3% eyedrops or Ciprofloxacin 0.3% or Chloramphenicol 0.5 to 1% or moxifloxacin eyedrops 1 drop every 2-3 hourly during day time
2. Gentamicin or Ciprofloxacin eye ointment instilled in inferior fornix at bedtime for 5-7 days.

If there is evidence of cellulitis or fever, treat accordingly (see section on Cellulitis and Orbital Cellulitis).

(**Caution:** Corticosteroid drops are contraindicated.)

If there is no response to empirical therapy after 7 days, stop all antibiotics and conjunctival swab should be obtained for Gram's stain and culture and sensitivity studies. Appropriate antibiotic should be selected based on culture sensitivity reports.

Acute purulent bacterial conjunctivitis : Most fulminant form due to *N. gonorrhoeae*. It is characterized by severe lid oedema, erythema, chemosis, thick purulent discharge, preauricular lymphadenopathy and frequent corneal involvement.

Ophthalmia Neonatorum : Neonatal conjunctivitis that occurs during the first 28 days of life due to gonococcal or nongonococcal bacteria(Herpes simplex II).The infection is acquired from the maternal birth canal.

Complications - corneal blindness, cataract, nystagmus, endophthalmitis or panophthalmitis and metastatic stomatitis and arthritis can occur.

Treatment

Nonpharmacological

Irrigate conjunctival sac with warm normal saline before antibiotic instillation, wipe away the discharge with moistened cotton wool.

Pharmacological (gonococcal ophthalmia neonatorum)

1. Crystalline Benzyl penicillin aqueous solution 10,000 to 20,000 U/ml (mix 5-10 ml of distilled water in a vial containing 5 lacs units of Penicillin G) instilled 1 drop every hour for 6 to 12 days and then 1 drop every 2-3 hours till the infection is resolved.

Or

Tobramycin 0.3% eyedrops every two hourly for 10 days.

Or

Gentamicin 0.3% eyedrops at every one hour interval.

Or

Ciprofloxacin 0.3% eyedrops every hour and 0.3% eye ointment at night.

2. If corneal involvement (see section on Corneal Ulcer).
Systemic treatment in full term babies with normal birth weight after sensitivity testing.
Inj. Procaine Penicillin G 4.8 million units in 2 divided doses IM for 7 days. In preterm low birth weight babies,
Inj. Procaine Penicillin G 20,000 units/kg/day 2-3 divided doses IM or IV for 3 days.
Or
Inj. Ceftriaxone 125 mg as a single IM dose (for penicillin allergic patients).
Or
Inj. Cefotaxime 100 mg/kg IM as a single injection.
3. Also treat mother with systemic therapy.
4. Treat chlamydial infection simultaneously as it may also coexist.

Pharmacological (non-gonococcal neonatorum)

1. Ciprofloxacin 0.3% eyedrops 1 drop every 2-4 hours and 0.3% eye ointment at night for 2 weeks.
Or
Gentamicin 0.3% eyedrops every 1 drop 2-4 hours and eye ointment at night for 2 weeks.
2. If evidence of systemic involvement:
Syr. Erythromycin 50 mg/kg/day in 4 divided doses for 14 days.

If extensive conjunctival or corneal involvement, also treat the parents, primarily mother. If no response after 1 week of therapy, refer for an appropriate culture and sensitivity testing to a tertiary care level.

Pharmacological treatment (gonorrhoea in pregnant women)

1. Inj. Procaine penicillin 4.8 million IV/IM with 1 g oral probenecid.
2. In Penicillin-resistant cases, Inj. Spectinomycin 4 g in 2 divided doses IM single injection in gluteal region.

Pharmacological treatment (chlamydial urogenital infection in pregnant women)

Tab. Roxithromycin 150 mg 2 times a day orally for 2 weeks (esteolate salt is contraindicated).

Or

Cap. Amoxycillin 500 mg orally 3 times a day for 7 days (in late pregnancy Erythromycin is preferred).

Intranatal care. Meticulous aseptic precautions during delivery. **Postnatal care.** Careful cleaning of closed eyelids immediately after birth. Povidone - Iodine 2.5% in both eyes 1 drop within 20 minutes of birth. Or

Tetracycline hydrochloride 1% eye ointment Or Silver nitrate 1% solution Or Gentamicin 0.3% eyedrops and ointment Or Norfloxacin 0.3% eyedrops and eye ointment Or Ciprofloxacin 0.3% eyedrops and ointment application after cleaning the eye. Suspect ophthalmia neonatorum, if there is any mucopurulent discharge from the eyes during first week.

References

1. Bacterial Chlamydial and Mycobacterial Infections. In: Principles and Practice of Ophthalmology. Albert and Jakobiec Azar Blodi (eds), 3rd edition, WB Saunders Co, 2008; pp. 705-713.
2. Ophthalmic Drug Facts. Facts and Comparisons: A Wolters Kluwer Company, St. Louis, Missouri, 2005; pp. 343-346.

B. Chlamydial Conjunctivitis - Trachoma

Chronic bilateral cicatrizing follicular keratoconjunctivitis caused by *Chlamydia trachomatis* and is the leading cause of preventable blindness worldwide.

Clinical Features

Presence of at least two of the following signs:

- Superior tarsal follicles,
- Limbal follicles (herbert's pits),
- Typical conjunctival scarring
- Vascular pannus.

Diagnosis is confirmed by conjunctival cytology.

Treatment

Pharmacological

Key to treatment is SAFE (Surgery for entropion/trichiasis, antibiotics, facial cleanliness, and environment change such as control of disease-spreading flies and access to clean water) strategy developed by the WHO.

1. Cap Azithromycin 1 g single dose in adults
In children: 20 mg/kg single dose

Or

Tab. Roxithromycin 150 mg 2 times a day for 7 days.

In children: 5.8 mg/kg in 2 divided doses.

Or

Cap. Doxycycline 100 mg 2 times a day for two weeks.

(**Caution:** Contraindicated in children, pregnant women and nursing mothers).

Or

Tab. Sulfamethoxazole 400 mg + Trimethoprim 80 mg 2 tablets twice daily for 3 weeks.

In children 6-12 years: half the above dosage for 3 weeks.

And/Or

Tetracycline 1% eye ointment at night for 6 weeks.

Or

Sulfacetamide 10-20% eyedrops 3-4 times for 6 weeks.

Or

Ciprofloxacin 0.3% ophthalmic solution 4 times a day and Ciprofloxacin 0.3% eye ointment at night for 8 weeks.

Surgical treatment

Eyelid surgery for correction of trichiasis and entropion to prevent corneal blindness.

References

1. Bacterial Chlamydial and Mycobacterial Infections. In: Principles and Practice of Ophthalmology. Albert and Jakobiec Azar Blodi (eds), 3rd edition, WB Saunders Co, 2008; pp. 705-713.
2. The SAFE Strategy for Trachoma Control: using Operational Research for Policy and Implementation. WHO Bulletin. 2006; 84: 589-684.

C. Viral Conjunctivitis

Includes following: epidemic keratoconjunctivitis, pharyngoconjunctival fever, acute haemorrhagic conjunctivitis and Newcastle conjunctivitis.

Conjunctival congestion, chemosis, watery discharge, conjunctival haemorrhages, preauricular lymphadenopathy and swollen lids; vision is unaffected; photophobia is uncommon.

Treatment

Nonpharmacological

Avoid patching, use dark goggles; avoid close contact with other persons and swimming for 2 weeks.

Pharmacological

It is usually a self-limiting illness. Antiviral agents are not effective. Corticosteroids are contraindicated; however, these are used, if vision is threatened.

1. Antibiotic eyedrops (as in mucopurulent conjunctivitis) prevent secondary infection.
2. Naphazoline 0.05% eyedrops 1 drop 4 times a day or Zinc sulphate 0.125% eye, drops 1 drop 4 times a day. Patient should be referred to an ophthalmologist, if there is no response in 7 to 10 days.

References

1. Ophthalmic Drug Facts. Facts and Comparisons: A Wolters Kluwer Company, St. Louis, Missouri, 2005; pp. 57-86.
2. Drugs used in Bacterial Infections: WHO Model Prescribing Information. World Health Organization, 2001.
3. Conjunctival and Corneal Pathology. In: Principles and Practice of Ophthalmology, 2nd Edition, Vol 1-6 WB Saunders Co. 2000; pp. 3609-3634.
4. Viral Disease of the Cornea and External Eye. In: Principles and Practice of Ophthalmology, 3rd Edition. Vol. 1-6 WB, Saunders Co. 2008; pp. 637-704.

1. Conjunctival Allergic Disorders

A. Acute allergic conjunctivitis (hay fever conjunctivitis)

Recurrent, bilateral type I, IgE mediated hypersensitivity to a variety of exogenous air-borne allergens such as pollens, animal dander, dust, moulds, etc. and may be seasonal, perennial, (chronic) or acute type.

Nonpharmacological treatment

Avoid allergen or minimize exposure to allergen, if possible dilution of allergen and washing away by instillation of tear substitutes and cold compresses to the eye.

Pharmacological

1. Topical combination of antihistamine (Antazoline 0.5% or Pheniramine) and vasoconstrictor (Naphazoline hydrochloride 0.05%) eyedrops 4 times a day till the resolution of symptoms
2. Disodium cromoglycate 4% eyedrops 2 times a day or 2% eyedrops 4 times a day till resolution of symptoms.

Or

Ketorolac tromethamine 0.5% eyedrops 4 times a day till resolution of symptoms.

(**Caution:** Topical corticosteroids are contraindicated as a first line therapy. If required should only be prescribed by an ophthalmologist, in low concentrations.

3. If severe, systemic antihistaminic should be administered. Tab. Cetirizine hydrochloride 10 mg once a day for duration of acute symptoms. In children, 5 mg once a day.
4. Olopatadine Eye drops 0.1% BD to QID can also be given as first line treatment.

B. Phlyctenular keratoconjunctivitis

It is characterized by presence of red nodule at bulbar conjunctiva, most often at nasal limbus of one eye. It is a cell mediated type (type IV) conjunctival hypersensitivity to tubercular protein, staphylococcal antigens, worm infestations, fungal antigens and idiopathic.

Topical treatment

1. Dexamethasone 0.1% eyedrops or Betamethasone 0.1% eyedrops combined with antibiotic Neomycin 0.5%, or Chloromycetin 0.5% eyedrops 4 times a day for 7 days.
2. If cornea is involved (see section on Corneal Ulcer).
3. Rule out any systemic cause and treat accordingly, especially if recurrent or bilateral keratoconjunctivitis.

Spring catarrh (vernal keratoconjunctivitis)

Bilateral, recurrent papillary conjunctivitis occurring in a warm climate due to hypersensitivity to exogenous allergens.

Clinical Features

- Itching,
- Ropy discharge,
- Gelatinous thickening at limbus and papillae (cobblestones) in upper palpebral conjunctiva.

Treatment

Nonpharmacological treatment

- Avoidance of allergen, wind, and rubbing of eye;
- Tear substitutes (barrier function, dilute allergen, wash away allergen);
- Wear glasses or goggles; air conditioning with appropriate filters.

Pharmacological

In mild cases;

- Topical antihistamine + vasoconstrictor combinations. Boric acid 1.25%; Naphazoline

0.05%; Zinc sulphate 0.12%; Antazoline hydrochloride 0.5%, Chlorpheniramine 0.01% 4 times a day.

- Disodium cromoglycate 4% eyedrops 2 times a day or 2% eyedrops 4 times a day.

Or

Ketorolac tromethamine 0.5% Or Ketotifen eyedrops 4 times a day.

Or

Olopatadine eyedrops 0.1% twice a day, or 0.2% once daily

In acute attacks and severe cases not resolving with above treatment, refer to an ophthalmologist for treatment with following:

Prednisolone sodium phosphate 1% eyedrops Or Dexamethasone 0.1% or Betamethasone 0.1% four times a day for 2 days, twice daily for 4 days, once daily for next 3 days and then discontinue.

Or

diluted steroids, dexamethasone eyedrops 0.01% or Loteprednol eyedrops 0.2% four times a day till acute symptoms subside and then tapered.

(**Caution:** Treatment should be given under the close supervision of an ophthalmologist).

References

1. Antiallergic and Decongestants. Ophthalmic Drug Facts. A Wolters Kliever Company, St. Louis, Missouri, 2000; pp. 52-86.
2. Clinical Ophthalmology, 4th edition. Butterworth Heinemann, Oxford, 1999.
3. Manual of Ocular Infection and Therapy, 4th edition, Little Brown Co. 1996.
4. Allergic and toxic reactions. In: Principles and Practice of Ophthalmology. Albert and Jakobiec Azar Blodi (eds), 3rd edition, WB Saunders Co, 2008; 611-624.

PAINFUL RED EYE

All painful red eye or visual loss should be referred immediately to a tertiary care level.

Glaucoma

Optic neuropathy which manifests as typical visual field defects (nerve fibre bundle defects), the aetiology of which is in some way related to intraocular pressure (IOP).

Classical triads -increased IOP, optic nerve head cupping and visual field changes

Treatment modalities differ according to the type of glaucoma.

Congenital glaucoma/ buphthalmos

IOP is usually normal as sclera in children distends leading to increased corneal diameter.

Excessive tearing and photophobia.

Pharmacological treatment

Aim is to control IOP till definitive treatment, i.e. surgery is performed.

- Timolol drops 0.25% eyedrops; one drop instilled at 12 hourly interval.

Or

Betaxolol 0.25% eyedrops one drop instilled at 12 hourly interval.

- Tab. Acetazolamide 12 mg/kg in 3-4 divided doses.

Surgical treatment at a tertiary care centre includes goniotomy and trabeculotomy or trabeculotomy with trabeculectomy.

Secondary childhood glaucoma

Secondary to certain developmental anomalies, which need to be treated along with the glaucoma.

Angle closure glaucoma – acute

Acute pain and blurring of vision along with headache and vomiting, in some cases.

Chronic angle closure glaucoma - peripheral synechiae, zipping up of the angle, and persistent rise of IOP with subsequent optic atrophy.

Pharmacological treatment

1. Inj. Mannitol 20%, 1.5-2 g/kg, IV infusion over half an hour. Or
Glycerol 50%, 1 to 1.5 g/kg in 50% solution orally, mixed with cold lemon or orange juice in 3-4 divided doses.
(**Caution:** It can cause hyperglycaemia in diabetic patients. Do not drink water for 1 hour after ingesting tablet; contraindications include dehydration or cardiac decompensation).
2. Pilocarpine 2% eyedrops every 15 min for 1 hour and thereafter 6 hourly started after IOP has been lowered by hyperosmotics as above.
3. Tab. Acetazolamide 500 mg stat followed by 250 mg every 6 hours and maintained till the definitive treatment of laser peripheral iridotomy relieves the pupillary block.
4. Timolol 0.5% eyedrops 2 times a day (if pressure is still high) to be continued till surgery.

Or

Betaxolol 0.5% eyedrops 2 times a day (Preferred in asthmatics and patients with cardiac conduction defects).

(**Caution:** All mydriatics/cycloplegic drugs which dilate pupils are contraindicated)

Once the IOP falls to early 20's by the treatment listed above—usually in a day or so, evaluated by gonioscopy, disc cupping and visual field charting. Definitive treatment is iridotomy by laser or surgery depending on the facilities available. Prophylactic laser peripheral iridotomy should be performed on the fellow eyes as soon as possible.

Angle closure glaucoma - chronic

IOP is raised due to progressive angle closure or by repeated intermittent subacute attacks secondary to pupillary block. Commonly asymptomatic until significant visual loss has occurred.

Pharmacological treatment

- Timolol 0.5% or Betaxolol 0.5% eyedrops 2 times a day usually required life-long.
- Pilocarpine 2-4% eyedrops 4 times a day usually required for life. Laser or surgical iridotomy is done to eliminate any element of pupillary block in affected as well as fellow eye. If the glaucoma is still uncontrolled on maximal tolerable medical therapy (i.e. 2 topical antiglaucoma medications), then glaucoma filtering surgery or trabeculectomy should be performed.

Primary open angle glaucoma

The IOP is usually above 21 mmHg with associated nerve head cupping and visual fields defects.

Usually asymptomatic, however, some complain of frequent change in spectacles and mild ache of the eyes.

Gonioscopically the angle of anterior chamber (AC) is widely open.

Pharmacological treatment

1. Timolol 0.5% or Betaxolol 0.5% eyedrops 1 drop 12 hourly and the morning dose should be as early upon waking as possible.

Or

Latanoprost 0.005% eyedrops given only once at bedtime.

(Caution: Maintain constant cold chain)

Or

Bimatoprost 0.03% eyedrops once at bedtime.

Or

Travoprost 0.004% eyedrops once at bedtime. (both do not require cold chain)

If initial therapy fails, refer to a higher centre and substitute with another agent preferably belonging to a different group.

2. Dorzolamide 2% eyedrops 2 to 3 times a day.

Or

Brimonidine tartarate 0.2% twice daily

Or

Pilocarpine 1-4% eyedrops 3 times a day or 4% gel once at bedtime.

If patient is not controlled on 2 topical drugs, then consider alternative treatment with either laser trabeculoplasty or glaucoma filtering surgery.

Lens-induced glaucoma

Lens-induced glaucoma occurs secondary to the cataractous lens either by leakage of lens protein or by lens intumescence. In addition to medically lowering the IOP, the cataractous lens needs to be removed, under steroid cover to suppress the inflammatory element.

Reference

1. In: Shield's Textbook of Glaucoma. Allingham, Ramji, Fredman, Moroi, Shafranov and Shields (eds). V Edition, Lippincott William & Wilkins, 2005.

CORNEAL ULCER (ULCERATIVE KERATITIS)

Corneal ulcer may be classified as: (i) bacterial corneal ulcer, (ii) fungal corneal ulcer (mycotic keratitis), (iii) viral corneal ulcer (herpetic keratitis), (iv) acanthamoeba keratitis.

Clinical Features

- Pain, redness, excessive tearing, photophobia, sticky discharge, swollen lids and blurred

vision, blepharospasm, ciliary congestion, corneal haziness, infiltration of cornea, ulcer/abscess in the cornea.

- Decreased corneal sensitivity, hypopyon, iritis, secondary glaucoma and superficial corneal vascularization.
- Corneal ulcer is stained green with fluorescein 2%.
- Complications: corneal thinning, ectasia, descemetocoele, secondary glaucoma, perforation and its sequelae including endophthalmitis or panophthalmitis and loss of eye.

Treatment (to be managed by an ophthalmologist)

Perform corneal scrapings to make smears for Gram and Giemsa stains and culture and sensitivity testing..

A. Bacterial corneal ulcer

Nonpharmacological treatment

- Avoid patching.
- Maintain proper ocular hygiene by regular cleaning of discharge twice a day.
- Removal of contributory factors, e.g. trichiasis, foreign body, entropion, dacryocystitis, etc.
- Removal of necrotic tissue increases efficacy of antibiotics.
- Prevention and treatment of complications—secondary glaucoma should be detected and treated adequately.

Pharmacological

Start empirical therapy and refer to an ophthalmologist

- Cefazolin 5% eyedrops (50 mg/ml) [mix 5 ml of distilled water in 250 mg of Cefazolin] solution or moxifloxacin eyedrops instilled 1 drop every 30 minutes or 1 hourly round the clock for at least 24 hours. (To be freshly prepared after 24 hrs)
- Topical fortified Gentamicin [mix 2 ml 80 mg injectable solution of Gentamicin in one vial of commercially available 0.3% 4 ml Gentamicin eyedrop solution (prepared fresh)] or Tobramycin 14 mg/ml (1.4%), instill 1 drop every 1/2- 1 hour for first 24 hours.
- Ciprofloxacin or Ofloxacin 0.3% eyedrops every 2 hours or Polymyxin-B sulfate 5000 IU and Chloramphenicol 4mg combination ointments TDS.
- Tear substitutes /surface lubricants - Sodium carboxymethyl cellulose 5mg suspension; Polyvinyl Alcohol 14mg /ml ; carboxymethyl cellulose 0.5% ; Hydroxypropyle methylecellulose eyedrop 1-2% etc 6-8 times/day .

Frequency of administration is reduced according to the response and continued for 2-3 weeks. If compliance with frequency of topical instillation as above is not possible:

- a. Cefazolin 100 mg subconjunctival injection after anaesthetizing the conjunctiva (if required).
- b. Subconjunctival Gentamicin 20 mg, if compliance to topical drops is unreliable.

Or

Fortified Tobramycin 14 mg/ml solution may be used in place of Gentamicin. Definitive therapy is started based on the culture and sensitivity of microorgan-isms.

- Atropine sulphate 1% eye ointment to be applied 2 or 3 times per day.
- Parenteral antibiotics are indicated in perforated corneal ulcer, impending perforation, corneal ulcer following perforating injury and infections caused by

Neisseria or *Haemophilus* microorganism.

(**Caution:** Corticosteroids are contraindicated. If associated with secondary glaucoma, see section on Glaucoma).

B. Fungal corneal ulcer (mycotic keratitis)

Develops 2-3 weeks following corneal injury with an organic or vegetative matter caused by *Fusarium*, *Aspergillus*, *Candida* and *Curvularia*.

Clinical Features

Dry, rough or cheesy appearance with feathery margins, satellite lesions, immune ring, endothelial plaque, thick immobile infected hypopyon.

Treatment

1. Regular debridement of the necrotic tissue.
Cauterization of the edges with Trichloroacetic acid/povidone iodine under topical anaesthesia (preferably under the supervision of an ophthalmologist).
Natamycin 5% suspension 1 to 2 hourly. And/or
Fluconazole 0.3% eyedrops 1 hourly round the clock.
In case of immunocompromized patients, spreading ulcer, perforation or impending perforation
Cap. Ketoconazole 200-400 mg 2 times a day for 2-3 weeks.

Or

Cap. Fluconazole 200 mg 2 times a day for 2-3 weeks.

Since superadded bacterial infection is common, add Ciprofloxacin or Tobramycin eyedrops (see section on Bacterial Conjunctivitis).

C. Viral corneal ulcer (Herpes simplex keratitis)

Unilateral or bilateral recurrent attacks of keratitis in the form of infections, epithelial keratitis, stromal keratitis, or endothelialitis, etc. The attack is often precipitated by trivial trauma, fever, cold, emotional stress, menstruation, etc.

Treatment (epithelial keratitis)

1. Acyclovir eye ointment 3% five times a day for 2-3 weeks.
Or
In refractory cases, Ganciclovir ophthalmic gel 0.15% five times a day till healing of ulcer, followed by three times a day for 7 days.
2. Topical Cycloplegics–Homatropine 2% eyedrops 2 times a day.
3. Broad-spectrum antibiotic as in the treatment of mucopurulent conjunctivitis till ulcer heals.
4. Artificial tear substitutes 3-4 times a day.

Refer to an ophthalmologist, if more than two recurrences occur, Tab. Acyclovir 400 mg 2 times a day for 3-6 months for prevention of recurrence.

References

1. Ophthalmic Drug Facts. Facts and Comparisons. A Wolters Kluwer Company, St Louis, Missouri, 2000.
2. Clinical Ophthalmology, 4th Edition. Butterworth Heinemann, 1999; pp. 183-260.
3. Manual of Ocular Infection and Therapy. 4th Edition. Little Brown Co, 1996; pp. 781-803.
4. Bacterial keratitis In Text book of ophthalmology Myron Yanoff and Jay S Duker 4th Edition; Mosby imprint by Elsevier 2013; page 222
5. Fungal Keratitis In Text book of ophthalmology Myron Yanoff and Jay S Duker 4th Edition; Mosby imprint by Elsevier 2013; page 226-227.

Treatment (stromal keratitis)

Nonpharmacological

Dark glasses with UV filter.

Pharmacological

1. Moderate to severe disease
Dexamethasone 0.1% or Prednisolone 1% eyedrops every 3 hours, tapered gradually on the basis of clinical response. For milder disease, lower concentration of 0.12% Prednisolone or 1: 10 dilution Dexamethasone 0.1% eyedrops 4 times a day, tapered slowly to once daily or once a week before stopping.
 2. Prophylactic Acyclovir eye ointment 2 times a day.
 3. Homatropine 2% eyedrops 1 drop 2 times a day.
- (**Caution:** Avoid corticosteroids in presence of epithelial ulceration; 1% Medroxyprogesterone may be used)
4. Artificial tears 3-4 times a day.

Reference

1. Viral Diseases of the Cornea and External Eye. In: Principles and Practice of Ophthalmology. Albert and Jakobiec Azar Blodi (eds), 3rd edition, WB Saunders Co, 2008; pp. 637-704.

SENILE CATARACT

Age-related opacification of crystalline lens, the exact cause is not known.

Clinical Features

- Gradual painless progressive diminution of vision in one or both eyes.
- Excessive glare, monocular diplopia or polyopia, coloured halos around lights,
- Diurnal variation in vision, change in colour values and fixed black spots before eyes.
- Ocular examination - greyish white or whitish lenticular opacity i.e. immature, mature or hypermature.

Detailed evaluation by distant direct ophthalmoscopy, slit-lamp examination, direct ophthalmoscopy, etc.

Treatment

Pharmacological

Definitive treatment of senile cataract is lens extraction.

Indications of lens extraction: visual handicap, interference in patient activities due to poor vision or glare disability, mature/hypermature cataract.

Optical treatment

In early cataract, decreased vision may be improved by accurate refraction and prescribing corrective spectacles.

Pupillary dilatation by instillation of 2.5% Phenylephrine eyedrops, or Tropicamide 0.5% eyedrops or Cyclopentolate 1% eyedrops in the morning may provide visual improvement in patient with minimal lenticular opacities in the axial area.

(Caution: Dilatation of pupil is contraindicated in patients with shallow anterior chamber).

Surgical Procedures- standard extracapsular cataract extraction (ECCE), phacoemulsification or nonphaco small incision surgery. Posterior chamber intraocular lens placed inside the capsular bag is the preferred modality.

References

1. Preoperative Evaluation of the Cataract Patient. In: Principles and Practice of Ophthalmology. Albert and Jakobiec Azar Blodi (eds), 3rd edition, WB Saunders Co, 2008; pp. 1415-1420.
2. Extracapsular Cataract Extraction. In: Principles and Practice of Ophthalmology. Albert and Jakobiec Azar Blodi (eds), 3rd edition, WB Saunders Co, 2008; pp. 1431-1439.
3. Phacoemulsification. In: Principles and Practice of Ophthalmology. Albert and Jakobiec Azar Blodi (eds), 3rd edition, WB Saunders Co, 2008; pp. 1441-1463.

DRY EYES SYNDROME

Ocular discomfort associated with decreased tear production and/or abnormally rapid tear film evaporation.

Common causes for dry eyes syndrome

Environmental: Excessive heat and air-conditioning.

Systemic: Ageing and menopause, side effect of antihistamines, birth control pills, diuretics, psychotropic drugs, etc. Diseases like Sjogren's syndrome, rheumatoid arthritis, collagen vascular diseases, etc.

Local: Abnormality of lacrimal gland, eyelids, ocular surface and lacrimal drainage system; topical medications and contact lens use.

Clinical features

- Ocular irritation and pain,
- Dryness, grittiness, foreign body sensation, itching, burning,
- Photophobia, redness, excessive tearing and blurring of vision.
- Conjunctival congestion, decreased tear, meniscus, irregular corneal surface and debris in the tear film.

- Corneal epithelial keratitis, fine or coarse, fluorescein/Rose Bengal staining and inflammation of ocular surface in advanced cases.
- In severe cases, mucous plaques, corneal filaments, epithelial defects, secondary infections, thinning and perforation of cornea can occur. There may be associated blepharitis, meibominitis and eyelid abnormality.

Tests for dry eyes - Schirmer's test, break up time, conjunctival cytology, tears osmolarity.

Treatment

Nonpharmacological

Hot compresses, eyelid massage

Pharmacological

Mild dry eyes

Artificial tear substitutes without preservatives up to four times a day [methylcellulose 0.5-1%, hydroxypropyl methylcellulose (HPMC), polyvinyl alcohol (1.4%), polyvinyl pyrrolidone (3-5%)].

Moderate dry eyes

1. Artificial tears without preservatives 4 times to 1 hourly a day (carboxymethyl cellulose 0.05 and 0.1%).
2. Lubricating eye ointment at bedtime.
3. 10% acetyl cysteine eyedrops 1-2 drops into the affected eye 3-4 times daily for excessive mucin secretions.
4. Topical anti-inflammatory treatment with cyclosporine- A 0.05% twice a day.

Severe dry eyes

Same as in moderate cases, along with temporary/permanent occlusion of all four puncta, moist environment (humidifier, moisture shields), and hydrophilic bandage contact lenses.

Surgical treatment

Reversible inferior punctual occlusion (punctual plugs)

Tarsorrhaphy (lateral and medial), conjunctival/mucous membrane grafting, parotid duct transplantation, amniotic membrane transplant, stem cell transplant.

References

1. Basic and Clinical Science Course, Section 8, External Diseases and Cornea. American Academy of Ophthalmology 2007-08, pp. 61-80.
2. Ocular Surface Disease, Section 6. In: Smolin and Throft's The Cornea, Scientific Foundations and Clinical Practice. Foster SC, Azar DT, Dohlman CH (eds). 4th edition 2005; pp. 573-646.
3. Dry Eye In Text book of ophthalmology Myron Yanoff and Jay S Duker 4th Edition ; Mosby imprint by Elsevier 2013 ;page-227 -278.

REFRACTIVE ERRORS

Refractive errors (ametropia) are the optical defects of eye in which the parallel rays of light entering the eye do not come to focus on the fovea centralis. Ametropia includes myopia, hypermetropia and astigmatism.

Clinical Features

- Blurred vision, subnormal vision, eye strain or asthenopia,
- Headache, tearing, latent or manifest strabismus, etc.

Treatment***Surgical***

1. Accurate retinoscopy and corrective spectacles or contact lenses. 2. Keratorefractive surgery.

Reference

1. Prescription of Spectacles. In: Principles and Practice of Ophthalmology. Albert and Jakobiec Azar Blodi (eds), 3rd edition, WB Saunders Co, 2008; pp. 5269-5274.

STRABISMUS (SQUINT)

Any child presenting with strabismus should have refractive error or any opacity in the media ruled out.

Treatment***Nonpharmacological***

Correct the refractive error or associated cataract, corneal opacity, etc. Fusion exercises for intermittent exotropia and other orthoptic exercises.

Surgical

Definitive therapy is surgical realignment of axis once other associated features have been treated.

Reference

1. Concomitant Strabismus. In: Principles and Practice of Ophthalmology. Albert and Jakobiec Azar Blodi (eds), 3rd edition, WB Saunders Co, 2008; pp. 4333-4343.

IRIDOCYCLITIS (ANTERIOR UVEITIS)

Uveitis is defined as inflammation of uveal tract, i.e. iris, ciliary body and choroid. Inflammation of iris and ciliary body constitutes iridocyclitis or anterior uveitis.

Clinical features

- Painful red eye,
- Diffuse periorbital pain,
- Photophobia, blurred vision, excessive tearing.
- Ocular examination - ciliary injection, normal or deep anterior chamber, small irregular pupil, posterior synechia, media opacities, tenderness of eyeball and variable decrease in vision.

Slit-lamp examination in active cases, reveals marked flare and cells in anterior chamber and fine keratic precipitates at the back of cornea. Posterior segment involvement and changes in intraocular pressure may occur in anterior uveitis.

Treatment (Refer immediately to an ophthalmologist)

Nonpharmacological

Dark glasses.

Pharmacological

Anterior Uveitis

1. Dexamethasone 0.1% eyedrops or Betamethasone 0.1% eyedrops or Prednisolone sodium phosphate 1% eyedrops or Prednisolone acetate 1% eyedrops. 1-2 hourly, tapered gradually on the basis of slit-lamp evidence of anterior chamber activity. If topical steroids are required for long term, switch over to Loteprednol 0.5% or fluoromethonol 0.1% to decrease chances of secondary glaucoma.
2. Homatropine hydrobromide 2% eyedrop solution.

Or

Atropine sulphate 1% eye ointment once or twice a day.

3. If no response (within 7 days), severe anterior uveitis, bilateral involvement and panuveitis.
Tab. Prednisolone 1 mg/kg or 40-80 mg per day orally every morning at breakfast or on alternate days. Gradually taper depending upon satisfactory clinical response over 2 to 4 week period.
4. If no response within 1 week or non-compliant, posterior uveitis or severe uveitis.
Periocular corticosteroids – subconjunctival or posterior subtenon injection (preferred).
Methylprednisolone acetate – 20, 40, 80 mg/ml or Triamcinolone acetonide (10, 40 mg/ml) 0.5-1.0 ml.
(**Caution:** Contraindication – infectious uveitis, e.g. herpetic or toxoplasmosis, known steroid responder, patients with glaucoma or elevated intraocular pressure.)
5. Close monitoring of intraocular pressure and treat appropriately, if elevated – Timolol maleate 0.5% eyedrops 2 times a day and/or Acetazolamide 250 mg 4 times a day 6 hourly.
Tab. Ibuprofen 400 mg 3 times a day.
6. Identify the specific cause and give specific therapy (syphilis, tuberculosis, herpes simplex, herpes zoster, toxoplasmosis, etc.)

Surgical treatment

surgical treatment is required for various complications of anterior uveitis.

Intermediate uveitis

- A. Periocular posterior subtenon depot corticosteroid injections – methyl prednisolone or triamcinolone 40mg/1ml to be used as first line of therapy . Can be repeated after 4weeks .
- B. Oral corticosteroids- Prednisolone 1 mg/kg/day, in either a single dose or divided doses. Depending on the response, the dose may be tapered over 2-4 weeks.
- C. Nepafenac eyedrop .1% 4-6 times for 4-6weeks

Posterior Uveitis

- A. Oral corticosteroids- Prednisolone 1 mg/kg/day, in either a single dose or divided doses. Depending on the response, the dose may be tapered over 4-6 weeks

- B. Treatment of specific etiological condition as guided by investigation reports.

Reference

1. The Cornea, Uveitis and Intraocular Neoplasms. In: Gowerbed Pub. London, 1992; pp. 3-38.
2. General approach to the uveitis patient and treatment strategies In Text book of ophthalmology- Myron Yanoff and Jay S Duker 4th Edition ; Mosby imprint by Elsevier 2013; page 696 – 775.

ORBITAL CELLULITIS

Suppurative inflammation of adipose and soft tissues of orbit is termed as orbital cellulitis.

Causes

- Spread of infection from paranasal sinuses, particularly ethmoid sinus
- Extension of infection from dental abscess, ear, face and lid infection,
- Panophthalmitis,
- Dacryocystitis, dacryoadenitis,
- Postoperative to any facial or ocular surgery,
- Perforating injury and haematogenous spread, etc.

Clinical Features

- Marked unilateral axial irreducible proptosis,
- Restricted and painful ocular motility,
- Lid oedema, chemosis of conjunctiva,
- Fever, headache, nausea, vomiting, malaise, prostration.

Treatment (Refer immediately to an ophthalmologist)

Nonpharmacological

Warm compresses.

Pharmacological

Severe cases are to be treated in the hospital.

1. Cap. Amoxycillin 500 mg plus Cloxacillin 500 mg in 3 divided doses for 10-14 days.

Or

Cap. Amoxycillin 250 mg plus Clavulanic acid (125 mg) every 8 hours.

2. Inj. Gentamicin 5 mg/kg in 2 divided doses for 7-10 days.

Or

Inj. Cefotaxime 1-2 g in 10 ml sterile water for injection over a period of 3-5 min every 12 hours. In neonates—100-150 mg/kg in 2-3 divided doses. In infants and children—50-180 mg/kg/day in 4-6 divided doses. Antibiotics are changed according to the report of culture and sensitivity and continue till resolution occurs.

3. For anaerobic infections

- Inj. Metronidazole 500 mg IV infusion 8 hourly, shifted to oral dose of 400 mg 8 hourly based on the clinical response for 2 weeks.
4. Oxymetazoline 0.05% nasal drops 2-3 drops in each nostril 2 times a day, in children: 0.025%.
 5. Symptomatic therapy for pain: antipyretics and analgesics in usual doses.
 6. Lubricating eyedrops/artificial tears: 1-2 hourly or antibiotic eye ointment 5 times a day to prevent exposure keratopathy.

Surgical treatment

Surgical drainage is indicated, if orbital abscess forms, based on clinical features, USG and CT scan findings; poor response or no response to the IV antibiotic therapy, or if there is a threat to ocular function.

Tarsorrhaphy or Frost suture to prevent exposure keratopathy. Sinusotomy/craniotomy for pus in paranasal sinus or brain abscess respectively. All the patients must be carefully monitored for vision, fundus, corneal exposure, ocular motility, pupillary reaction, corneal sensations, proptosis, systemic status including CNS function.

Reference

1. Infectious Processes of the Orbit. In: Principles and Practice of Ophthalmology. Albert and Jakobiec Azar Blodi (eds), 3rd edition, WB Saunders Co, 2008; pp. 2961-2975.

ENDOPHTHALMITIS

Endophthalmitis is of two types: (1) exogenous - by the direct inoculation of infecting agent through breach in the continuity of ocular coats, e.g. postoperative, post-traumatic, (2) endogenous - haematogenous spread of infective agents. Both may be bacterial or fungal.

Clinical Features

- Marked visual loss,
- Ocular pain, intense redness and lid swelling
- Headache, photophobia
- Ocular discharge,
- Ocular examination - conjunctival and ciliary congestion, profound decrease in vision even up to perception of light with accurate or inaccurate projection of rays.
- Corneal oedema, hypopyon, signs of uveitis, reduction in intraocular pressure, exudation in vitreous leading to reduced or absent fundus reflex are the other associated features.

Treatment (Refer immediately to an ophthalmologist)

Postoperative bacterial endophthalmitis

Pharmacological

1. Intravitreal injection of antibiotics—Inj. Vancomycin hydrochloride 1 mg in 0.1 ml plus Inj. Ceftazidime 2.25 mg in 0.1 ml or Inj. Amikacin sulphate 0.4 mg in 0.1 ml.
2. Subconjunctival injection Vancomycin 25 mg/0.5 ml plus Ceftazidime 100 mg/0.5 ml plus Dexamethasone 0.25 mg/0.5 ml.

3. Vancomycin eyedrops 50 mg/ml plus Amikacin eyedrops 15 mg/ml 1 drop every 6 hours.
4. Homatropine 2% eyedrops 3 times a day or Atropine 1% eye ointment 2 times a day.
5. Prednisolone acetate 1% eyedrops or Dexamethasone or Betamethasone 0.1% eyedrops every 6 hours.
6. Tab. Prednisolone 1 mg/kg/day in a single morning dose after 24 hours of antibiotic use and continue for 10-14 days.
7. Parenteral antibiotics are given as a supportive therapy.
8. Change the antibiotic according to vitreous culture and sensitivity, if required.

Surgical treatment

Vitrectomy—pars plana vitrectomy is indicated, if visual acuity is limited to light perception or if there is poor response to above treatment in 30-36 hours. Vitrectomy may also be required in the resolved phase of endophthalmitis for vitreous opacification/ membranes.

Treatment for traumatic endophthalmitis

Pharmacological

1. Hospitalize the patient and give immunization for tetanus.
2. Inj. Vancomycin 1 g IV infused over 1 hour every 12 hour.
Inj. Gentamicin 2 mg/kg every 12 hour.
Or
Inj. Ceftazidime 2 g IV every 12 hour.
Or
Inj. Ceftriaxone 2 g IV/day.
3. Clindamycin should be considered in all cases until *B. cereus* infection has been excluded
Inj. Clindamycin 600-900 mg IV every 8 hour. In children 20-40 mg/kg/day IV 6-8 hourly.
Continue antibiotics for 7-10 days.
4. Topical fortified eyedrops, subconjunctival injection and intravitreal injection and cycloplegic drops as in cases of postoperative bacterial, endophthalmitis.

Surgical treatment

Repair the ruptured eyeball at the earliest.

Pars plana vitrectomy—indications are similar to that of postoperative bacterial endophthalmitis.

Treatment for fungal endophthalmitis

Exogenous fungal infections may occur postoperatively or secondary to trauma. Endogenous fungal endophthalmitis should be treated as an emergency treatment.

Pharmacological

1. Vitrectomy to debulk the vitreous of fungi.
2. Intravitreal Amphotericin B 5-10 mcg/0.1 ml or Fluconazole 25 mcg/0.1 ml.
3. Inj. Amphotericin B 0.5-1.5 mg/kg/day slow infusion over 2-6 hours. (50 mg vial in powder form and is dissolved in 5% dextrose) for 10-14 days.

Or

Tab. Fluconazole 400 mg loading dose followed by 200 mg daily, total dose should not exceed 600 mg/day.

In children 12 mg/kg loading dose followed by 6 mg/kg/day.

Or

Tab. Ketoconazole 200 mg orally 2 times a day or daily. In children above 2 years of age, 3.3-6.6 mg/kg/day.

4. Homatropine 2% eyedrops 4 times a day or Atropine 1% eye ointment 2 times a day.

References

1. Endophthalmitis Vitrectomy Study Group: Results of the endophthalmitis vitrectomy. Arch Ophthalmol 1995; 113:1479-1496.
2. Fungal Infections and the Eye. In: Principles and Practice of Ophthalmology. Albert and Jakobiec Azar Blodi (eds), 3rd edition, WB Saunders Co, 2008; pp. 4717-4749.

OPTIC NEURITIS

Optic neuritis includes papillitis (inflammation of optic disc), retrobulbar neuritis (inflammation of retro-ocular portion of optic nerve) and neuroretinitis when both optic disc and retina are inflamed.

Causes

- Demyelinating diseases (usually multiple sclerosis),
- Systemic viral/bacterial infections,
- Autoimmune diseases and
- Secondary to ocular inflammations, e.g. Uveitis, endophthalmitis, orbital cellulitis, etc.

Clinical Features

- Unilateral or bilateral, sudden severe visual loss, ipsilateral eye pain;
- Markedly impaired colour vision,
- Visual obscurations in bright light and episodic transient visual obscuration on physical exertion, hot bath, hot weather, fatigue, etc.
- Profound decrease in visual acuity, dyschromatopsia, central or paracentral scotoma, tenderness of the globe near superior rectus insertion and reduced visually evoked response.
- Marked abnormality in pupillary response to light reflex (sluggish or afferent pupil defect).
- Fundus examination reveals optic disc oedema with or without flame-shaped retinal haemorrhages in papillitis and neuroretinitis and a normal fundus in retrobulbar neuritis.

Treatment (Refer immediately to an ophthalmologist)

Proven case of multiple sclerosis may benefit with following:

Inj. Methylprednisolone 1 g/day (or 15 mg/kg/day) IV in 2-4 divided doses, or single dose for 3 days followed by Tab. Prednisolone 1 mg/kg/day orally for 11 days, taper by 20 mg on day 12 and then 10 mg/day on day 13 and 15.

In case of proven infective aetiology, administer appropriate systemic antibiotic to eliminate the focus of infection.

(**Caution:** Oral prednisolone alone is not recommended).

References

1. Ophthalmic Drug Facts. Facts and Comparisons. A Wolters Kliever Company, St Louis, Missouri, 2005.
2. Optics neuritis. In: Principles and Practice of Ophthalmology. Albert and Jakobiec Azar Blodi (eds), 3rd edition, WB Saunders Co, 2008; pp. 3871-3885.

DIABETIC RETINOPATHY

Diabetic retinopathy (DR) is the microangiopathy of retinal vasculature occurring in long-standing diabetes mellitus. It is classified into nonproliferative DR and proliferative DR; diabetic macular oedema may be present at any of these stages.

Treatment

Nonpharmacological

Early diagnosis, proper diabetic control, careful follow-up, fundus photography, fluorescein angiography and timely laser photocoagulation or vitrectomy surgery or both.

Pharmacological

1. Refer to Ophthalmologist- tertiary care centre
2. Strict control of diabetes mellitus.
3. Diabetic macular edema-
Nepafenac eye drop 0.1% 3 times a day
Intravitreal anti VEGF/Steroid
Laser photocoagulation
4. Non proliferative DR- Regular 3-6 months follow up.
5. Proliferative DR – If high risk characteristics – Pan retinal photocoagulation.

No time tested and proven pharmacological treatment exists which can delay, prevent or cure diabetic retinopathy.

Reference

1. Diagnosis, Management and Treatment of Nonproliferative Diabetic Retinopathy. In: Principles and Practice of Ophthalmology. Albert and Jakobiec Azar Blodi (eds), 3rd edition, WB Saunders Co, 2008; pp. 1775-1791.

RETINAL DETACHMENT (RD)

Retinal detachment is defined as separation of the sensory retina from retinal pigment epithelium. RD involving macula results in profound visual loss. Retinal detachments are of three types: (i) Rhegmatogenous RD, (ii) Exudative RD and (iii) Tractional RD (glial bands on retina).

Clinical features

- Flashes of light, sudden shower of black spots and veiled visions,

- Loss of central vision, if macula also detached.

Diagnosis - by examination of fundus by distant direct ophthalmoscopy, direct and indirect ophthalmoscopy. The detached retina appears grey with oscillating folds.

Treatment (To be treated by an ophthalmologist)

Pharmacological

There is no pharmacological therapy, which can prevent delay or cure rhegmatogenous (RD). Exudative RD due to inflammatory conditions such as panuveitis (VKH syndrome, sympathetic ophthalmitis) or posterior scleritis is treated with systemic corticosteroid and/or pulsed methyl prednisolone therapy as described in the treatment of uveitis and optic neuritis. The cases which are refractory to corticosteroids or if serious steroid-induced complications develop, refer patient for treatment with immunosuppressive drugs to a tertiary care hospital.

Surgical treatment for rhegmatogenous RD

Treatment of choice is reattachment surgery involving:

Sealing of retinal break by creating aseptic chorioretinitis using cryotherapy or laser photocoagulation,

And/Or

Scleral buckling.

Or

Vitreoretinal surgery with internal tamponade using gases or silicone oil.

Reference

1. Retinal Detachment. In: Principles and Practice of Ophthalmology. Albert and Jakobiec Azar Blodi (eds), 3rd edition, WB Saunders Co, 2008; pp. 2305-2313.

CHAPTER 14

SKIN DISEASES

BACTERIAL SKIN INFECTIONS

Superficial bacterial infections (pyoderma) are commonly caused by *Staphylococcus aureus* and *Streptococci*.

Clinical features

- Skin involvement present as impetigo contagiosa, bullous impetigo and ecthyma.
- Hair follicle involvement can lead to folliculitis, furunculosis or carbuncle.
- Clinically, a suppurative lesion of a hair follicle can be observed. A group of adjacent furuncles with subcutaneous involvement and multiple discharging sinuses is seen in a carbuncle. Diabetes is an important predisposing factor.
- Invasive infection presents as erythematous indurated well-defined plaque with raised edge or frank cellulitis with constitutional symptoms and regional lymphadenopathy.

Treatment

Nonpharmacological

- Advise for proper hygiene and nutrition.
- Advise for removal of dirt, crusts and necrotic debris by washing with non-medicated soap and water and drainage of pus.

Pharmacological (furunculosis, folliculitis)

A. Mild and localized superficial infection

Give topical therapy with following, which should be applied locally twice a day as a thin film after thoroughly washing the affected sites with soap and water for 7-10 days.

Cream Framycetin sulphate 1% in base.

Or

Cream Sodium fusidate base 2%.

Or

Ointment Mupirocin base 2%.

B. Multiple site superficial pyoderma, invasive varieties and secondary pyoderma

Cap. Cloxacillin 250-500 mg 6 hourly for 5-7 days.

In children: 50-100 mg/kg in 4 divided doses for 5-7 days.

Or

Cap. Cephalexin 500 mg orally 6 hourly for 5-7 days.

In children: 30-50 mg/kg in 4 divided doses for 5-7 days.

Or

Tab. Cotrimoxazole (960 mg) 12 hourly for 5-7 days.

In children: 6 mg/kg/day of Trimethoprim in 2 divided doses for 5-7 days.

C. *Impetigo*

Cap. Cloxacillin or Cephalexin in same doses as above.

Or

Tab. Erythromycin stearate 250-500 mg every 6 hours for 7 days.

In children: Syr. Erythromycin 30-50 mg/kg/day in 4 divided doses for 7 days.

If no response to the above treatment within 48 to 96 hours, refer to a tertiary care level.

CELLULITIS AND ERYSIPELAS

Cellulitis and erysipelas are usually streptococcal or staphylococcal infections of the subcutaneous tissues, resulting from contamination of minor wounds

Clinical features

- Acute localized inflammation and oedema.
- Erysipelas - superficial and has a well-defined, raised margin.
- Potentially fatal systemic toxæmia may supervene in patients who remain untreated.
- Recurrent cellulitis or erysipelas can result in chronic changes in affected skin and lymphatics.

Treatment

Regimen A or regimen B depending on severity of disease condition.

Regimen A

Cap. Cloxacillin 500mg 6 hourly for 7 days

In children 12.5-25 mg/kg 6 hourly

Or

Cap. Cephalexin 500mg 6 hours for 7 days

In children 10mg/kg per day orally in three divided doses.

Regime B

Inj. Amoxycillin 250

mg plus Clavulanic acid 125 mg 3 times a day for 7-10 days.

In children Amoxycillin 6.7mg/kg plus Clavulanic acid 1.7mg/kg 3 times day for 7-10 days.

Once improved, patients maybe switched to oral equivalent dosages.

If localized cellulitis

Cap. Amoxicillin 500mg orally 8 hourly. In children 10mg/kg 8 hourly.

Or

Cap. Cephalexin 500mg orally 6 hourly. In children 12.5-25mg/kg upto 500mg orally 6 hourly.

In patients hypersensitive to penicillin (or beta lactam) other class of antibiotic as per sensitivity of the organism may be used

LEPROSY

Chronic granulomatous disease affecting skin and nerves caused by *Mycobacterium leprae*. Mode of spread is by respiratory droplet infection and close personal contact.

Clinical Features

- Cardinal signs -hypo-pigmented, hypoaesthetic skin lesions and or nerve involvement in the form of tingling sensation, paraesthesia or gross sensory or motor deficit, thickening of nerves and demonstration of AFB within the skin.
- Leprosy may be Paucibacillary (PB): Patient with < 5 hypoaesthetic, hypopigmented lesions (including localized single nerve);
- Multibacillary (MB): Patient with 5 or more lesions including skin and nerves.

Investigations

- Haemogram,
- Liver Function Tests
- Slit skin smear
- Chest x-ray
- Tests to rule out G6PD deficiency or more than one nerve trunk involvement.

Treatment

Blister pack for MB and PB are available at all health centers; each contains all medicines for 28 days. Treatment requires for paucibacillary (PB) and multibacillary leprosy in children is shown in Table 14.1.

Blister pack for MB patients

Dosage (adult MB)

Supervised treatment on day 1. Following is a 28 day cycle which has to be repeated 12 times.

Day 1. Rifampicin (R): 600 mg, Clofazimine (C): 300mg, and Dapsone (D): 100mg.

Domiciliary treatment for 2-28 days: C: 50mg, D: 100mg.

Dosage (children <10 years)

Day 1. Supervised R: 300mg, C: 100mg, D: 25mg.

Day 2-28 domiciliary: C: 50mg twice a week D: 25 mg daily.

Duration: Patient has to take a total of 12 blister packs within 18 months.

Blister pack for PB patients

Dosage (adult PB)

Following is a 28 day cycle, which has to be repeated 6 times. Monthly treatment

Day 1 (Supervised), R: 600mg D: 100mg.

Daily treatment: Day 2-28: D: 100mg.

Dosage children <10 years.

Day 1. (Supervised) R: 300mg D: 25mg.

Day 2-28. D: 25mg.

Adult (single dose therapy)

Rifampicin: 600mg, Ofloxacin: 400mg, Minocycline: 100mg.

Child (Single dose therapy):

Rifampicin:300mg, Ofloxacin:200mg, Minocycline:50mg.

Table 14.1.Regimenf or paucibacillary (PB) and multibacillary (MB)

	<30 kg	30-45 kg	>45 kg
PB	Rif 300 mg po/mth Dapsone 25 mg/d	Rif 450 mg po/mth Dapsone 50 mg/d	Rif 600 mg po/mth Dapsone 100 mg/d
MB	Rif 300 mg po/mth Clofazimine 100mg po/mth +50mg twice a week Dapsone 25mg/d	Rif 450 mg po/mth Clofazimine 150mg po/mth + 50 mg alternate day, Dapsone 50mg/d	Rif 600mg po/mth Clofazimine 300mg po/mth +50mg/d Dapsone 100mg/d

If the treatment is interrupted for more than one month at a stretch the regimen should be recommenced where it was left off to complete the full course. The patient should be reviewed in detail for persisting disease at the end of therapy.

Management of complications (acute or subacute inflammation)

Reversal reaction or type 1 reaction and erythema nodosum leprosum or type 2 reaction

If the reaction is mild (no nerve involvement): Bed rest and paracetamol. If there is nerve involvement or suspected neuritis or signs of nerve damage-refer to a tertiary care hospital.

Tab. Prednisolone 40-60 mg once a day and gradually reduced weekly or fortnightly and eventually stopped (12 week course).

Continue treatment with multi-drug therapy (MDT) without interruption along with anti-reaction treatment.

References

1. Leprosy.In:Textbook of Dermatology.Champion R Hetal.(Eds),6thEdition, Blackwell Science Ltd.,London,pp 1215.
2. Leprosy In: Dermatology in General Medicine. Fitzpatrick T B et al (eds), 5th Edition, McGraw Hill Company Inc., NewYork, pp2306.

CUTANEOUS TUBERCULOSIS

Cutaneous tuberculosis affects skin and/or mucosa with or without underlying systemic involvement.

Clinical Features

- **LupusVulgaris-** granulomatous lesion with marginal activation central clearing and atrophy.
- **Scrofuloderma** -granulomatous ulcer with fibrosis, atrophy, sinus formation and deeper structure involvement as the focus of suppuration.
- **Tuberculosis veruccosacutis-** verrucous plaque with atrophy.

Investigations

- Haemogram with ESR,
- Mantoux test,
- Chest X-ray,
- Sputum examination and AFB staining
- FNAC/skin biopsy

Screen the patients for underlying immuno-suppression particularly if extensive or multifocal disease is present.

Treatment

Treatment given in two phases:

1. Initial phase- 2 EHRZ/ 2 SHRZ (for details see section on tuberculosis).
2. Continuation phase- 4RH.

In specialized situations like scrofuloderma with an underlying focus in a bone/ joint the regimen should be suitably prolonged in consultation with an orthopaedic specialist.

References

1. Antitubercular Therapy. Mycobacterial Infections. In: Textbook of Dermatology. Champion R H et al.(eds), 6th Edition, Blackwell Science Ltd., London, pp1189.
2. Tuberculosis and other Mycobacterial Infections. In: Dermatology in General Medicine – Fitzpatrick T B et al (eds), 5th Edition NewYork, pp2274.

SCABIES

A common skin infestation caused by arthropod mite (*Sarcoptes scabiei*) and transmitted by close personal contact after an incubation period of 3-4 weeks.

Clinical features

- Nocturnal itching, excoriated papules, papulovesicles, burrows and excoriation, lesions seen on interdigital clefts of hands, wrist, axillary folds, breasts, periumbilical region, medial side of thigh and genitals (in males).
- Burrows are pathognomonic and a family/contact history of similar complaints invariably present.

Common complications- secondary pyoderma, eczematization and glomerulonephritis (poststreptococcal).

Treatment

Nonpharmacological

Maintenance of adequate personal hygiene by daily bath with soap and water.

Pharmacological

Secondary bacterial infection when present should be treated with antibiotics before specific antiscabietic therapy.

1. Specific therapy

For infants, neonates, children, pregnant and lactating mothers. Permethrin cream 5% to be applied generously, after bath, at bedtime, covering entire surface of the body below neck (except face) .

Minimum contact period 8-12 hours; single application required and is to be washed off next morning.

For children >10 years and adults. Permethrin cream 5% as outlined above.

Or

Gamma Benzene Hexachloride (GBHC) Lotion 1%. Single overnight application below neck on entire body surface after a thorough scrub bath. Minimum contact period 8-12 hours, to be washed off next morning.

Or

Tab Ivermectin 200 mcg/kg as a single dose to be repeated after 2 weeks.

2. Supportive therapy

Tab. Cetirizine 10mg at night for 10-15 days.

In children 0.3mg/kg/day single dose for 2 weeks.

Or

Tab. Pheniramine maleate 25mg 3 times a day for 10-15 days.

In children 0.5mg/kg/day divided in 3 doses.

Follow up after one week, if problematic itching persists, a topical anti-pruritic such as crotamiton either alone or in combination with hydrocortisone may be advised after ensuring adequacy of antiscabetic treatment.

References

1. Disease Caused by Arthropods and other Noxious Animals. In: Textbook of Dermatology. Champion R H et al.(eds), 6th Edition, Blackwell Science Ltd., London, pp1458.
2. Scabies and Pediculosis. In: Dermatology in General Medicine, Fitzpatrick T B et al (eds), 5th Edition, McGrawHill Company Inc., New York, pp2677.

PEDICULOSIS (LICE INFESTATION)

.Two species of lice are obligate parasites in man namely i) *Pediculus hominis* and ii) *Phthirus pubis* (the pubic louse).

Clinical Features

- Severe itching, frequently followed by secondary bacterial infection with regional lymphadenopathy and eczematization, resulting in matting of hair,
- Transmission occurs by head to head contact, sharing of combs and caps, infested clothing of bedding and poor personal hygiene; transmission of pubic lice is by sexual contact.
- Bluegrey-maculae (maculae cerulean) of altered blood may be seen at the site of lousebite /feed.

Treatment

Nonpharmacological

- Infested clothing and bedding should be washed properly in hot water and dried in sunlight. Clothes should be ironed from inside with special attention to seamline.
- In pubic lice infestation, sex partner should be treated as well.

Pharmacological

1. Specific therapy

Lotion GBHC 1% to be applied on scalp (in head louse infestation), whole body including pubic region, thighs, buttocks (in pubic and body lice infestation) for a period of 12 hours to be washed off later on.

Or

1% Permethrin in surfactant rinse, single one hour application on the affected area.

For scalp lice repeat application after one week after surviving eggs have hatched.

2. Supportive therapy

If persistent itching,

Tab.Cetirizine 10mg once daily at night for 7 days.

In Children (2-6 years) 5mg;(>6 years) 10mg once daily.

Or

Tab. Pheniramine maleate 25mg 3 times a day for 7 days.

In Children 0.5mg/kg/day in 3 divided doses.

3. Treatment of the secondary infection

(see section on bacterial skin infections).

References

1. Diseases caused by Arthropods and other Noxious Animals. In: Textbook of Dermatology. Champion R H et al .(eds), 6th Edition, Blackwell Science Ltd., London, pp1423.
2. Scabies and Pediculosis. In: Dermatology in General Medicine. Fitzpatrick T B et al (eds)5th Edition, McGraw Hill Company Inc.,NewYork, pp2680.

MYIASIS (MAGGOTS)

Myiasis is the infestation of body tissues of man and animals by the larvae of *Diptera* (two-winged flies).

Clinically classified according to the part of the body affected:

- Cutaneous myiasis,
- Wound myiasis and furunculosis
- Intestinal myiasis
- Urogenital myiasis

Clinical Features

- The eggs or larva (maggots) can be seen in large numbers in the denuded or raw lesions.
- In the furuncular form, boil like lesions develop gradually over a few days; each lesion has a central punctum, which discharges serosanguineous fluid. Posterior end of the larva is usually visible in the punctum.
- Regional lymphadenopathy, mild constitutional symptoms and eosinophilia may be present.

Treatment

Treatment of secondary bacterial infection as in treatment of cellulitis and erysipelas (see section on bacterial skin infections).

Liquid paraffin and turpentine oil application is followed by gentle removal of the larva with the help of a forceps. Sometimes the punctum needs to be enlarged by cruciate incisions in furuncular myiasis.

Reference

1. Diseases caused by Arthropods and other Noxious Animals. In: Textbook of Dermatology. Champion R H et al (eds), 6th Edition. Blackwell Science Ltd., London.

ONYCHOMYCOSIS (TINEA UNGUIUM)

Invasion of the nailplate by *Dermatophytes*, *Candida*, *Scytalidium* or other non Dermatophytes moulds is called Onychomycosis.

Clinical features

- The nail plate may appear to be discoloured (yellow, green or black), disfigured or, in extreme cases, might be totally destroyed.
- The nail folds may also show swelling, and redness.

Treatment

Pharmacological

It is prudent to determine the type of organism causing onychomycosis.

Systemic therapy

Tab. Terbinafine 250mg once a day for 6 weeks for fingernails and 12 weeks for toe nails.

In children <20kg: 62.5mg/day; <40 kg: 125mg/day; >40 kg 250mg/day. No role of topical treatment.

Plus Tab Fluconazole 150 mg 1 tab per week for 3 months for finger nails and 6 months for toe nail onychomycosis.

For dermatophytes

Tab Griseofulvin (ultramicrosized) 250mg twice daily after fat containing meals (or with milk) for 4-6 months for fingernails and 18-24 months for the toe nails.

In Children: 10-20mg/kg twice daily as above.

CANDIDIASIS

Candidiasis is an infection with protean clinical manifestations, caused by *Candida* species that are also part of normal skin/ mucosal flora.

Cutaneous candidiasis

- Intertrigo on glabrous skin.
- Common locations- genitourinary, perineal, axillary, gluteal, interdigital and sub-mammary areas and between the folds of skin of the abdominal wall.
- Pruritus, erythematous macerated areas of skin with satellite vesicopustules

CANDIDAL PARONYCHIA

It is common in individuals whose hands are chronically involved in wetwork e.g. housewives, bakers, fishermen, paan vendors etc.

Clinical Features

Redness, swelling and tenderness of the paronychia area with prominent retraction of cuticle toward the proximal nailbed. Occasionally pus can be expressed from beneath this area. The nails might also be infected and discolored.

Oral candidiasis

See section on gastrointestinal diseases.

Treatment

Nonpharmacological

To keep the affected area dry and clean.

Pharmacological (Candidal Paronychia)

Cap. Fluconazole 3-6 mg/kg (maximum 150mg) orally once a week depending upon the area affected for 4-6 weeks. In case nail plate is also involved treat as onychomycosis (except Griseofulvin).

Pharmacological (Mucocutaneous candidosis)

Topical 1% clotrimazole or 2% miconazole nitrate or 1% ciclopirox cream gel or lotion twice daily for 14 days.

TINEA CAPITIS

Ringworm of the scalp in which the essential feature is invasion of hair shafts by a dermatophyte fungus.

Clinical Features

- Gray scaly patch appears as patches of partial alopecia often oval or circular in shape with fine scaling. Green fluorescence under the wood's lamp is usual (in microsporum infection).
- Kerion is a painful inflammatory condition, seen as hair follicles discharging pus, thick crusting and matting of adjacent hair.
- Black-dot variety (relatively non-inflammatory type) of patchy alopecia- seen as black dots occur as the affected hair breaks at the surface of the scalp.
- Favus: yellowish, cup-shaped crusts known as scutula. Adjacent crusts enlarge to become confluent and form a mass of yellow crusting.

Diagnosis- by demonstration of spores in KOH wet mount preparation of affected hair and/or brilliant green fluorescence in wood's lamp examination.

Treatment

No role of topical therapy alone.

Systemic therapy

Tab. Griseofulvin 10-20 mg/kg in 2 divided doses for 4-6 weeks.

TINEA CORPORIS AND CRURIS

Circular, sharply marginated, itchy and scaly plaques with raised edges with papulovesicles at margins and central clearing.

Diagnosis is made by KOH smear and culture.

Treatment

Topical Treatment in localized disease (not for Tinea pedis)

1. Ointment/Cream/gel/powder/spray
Clotrimazole 1% twice daily for 4-6 weeks
Or
Miconazole 2% twice daily for 4-6 weeks
Or
Terbinafine 1% once daily for 2 weeks
Or
Butenafine 1% once daily for 2 weeks
Or
Ciclopiroxolamine 1% twice daily for 4-6 weeks.
2. Systemic treatment (in extensive lesions and for Tinea pedis)
Tab Griseofulvin 10mg/kg for 4-6 weeks
Or
Tab Fluconazole 3-6 mg/kg/week for 4-6 weeks
Or
Tab Terbinafine 250 mg/day for 2 weeks
Or
Cap Itraconazole 100mg once daily for 4 weeks
NO use of steroid local or systemic.

TINEA PEDIS IMMANUM AND INTERTRIGINOUS TINEA

Clinical Features

- Peeling, maceration, fissuring affecting the lateral toe clefts.
- Hyperkeratotic plaque (affected areas are pink and covered with fine silvery. White scales).
- Vesiculobullous lesions particularly at periphery.

Treatment

Nonpharmacological

Improvement of hygiene in swimming pools such as frequent washing of changing room floors and walkways, use of personal towel and footwear.

Use of antifungal dusting powder.

Pharmacological

Same as Tinea corporis.

Reference

1. Mycology. In: Textbook of Dermatology. Champion R H et al (Eds), Blackwell Science, Oxford, pp 1277-1366.

DIAPER DERMATITIS

It is induced by the occlusion of the areas covered by impermeable diapers, often triggered by an episode of diarrhoea.

Treatment

Zinc oxide paste (petroleum jelly 50%, zinc oxide 50%) may prevent skin irritation due to diarrhoea.

Problematic cases to be referred to a specialist.

ECZEMA AND DERMATITIS

Eczema is an inflammatory skin reaction characterized by itching, redness, scaling and clustered papulovesicles. It is divided into:

Endogenous (constitutional): atopic dermatitis, seborrheic dermatitis, lichen simplex chronicus (LSCh)

Exogenous (environmental): contact allergic dermatitis, primary irritant dermatitis, photosensitive eczema) etc.

Clinical features

- Itching and vesicular eruptions on erythematous skin with erosion and exudation in acute cases or thickening,
- Accentuated skin markings,
- Fissuring with pigmentation (described as lichenification) in chronic cases.

Treatment

1. Local treatment

In acute exudative eczema:

Soak with dilute Potassium permanganate solution (1:10,000) and 0.25% Silver nitrate solution or 0.8% aluminium subacetate solution.

In longstanding situations:

Acute/subacute- appropriate topical steroid (Table 14.2) in lotion/gel or cream base for 2-4 weeks.

Chronic longstanding and/or lichenified lesions-appropriate topical steroid (Table 14.2) in ointment/emollient base for 2-4 weeks.

Table 14.2. Preparations of local corticosteroids available in the market as lotion, creams and ointments*

Group 1 (mild)	(Hydrocortisone acetate 1%, Desonide 0.05%) Generally safe for chronic application. Safest amongst steroids for use on face, under occlusion/bandage, in neonates/infants. Not expected to cause local or systemic side effects in the course of normal use.
Group 2 (moderately potent)	(Clobetasone butyrate 0.05%, Mometasone furoate 0.1%, Fluticasone propionate 0.01%, Betamethasone valerate 0.05-0.1%) Hydrocortisone butyrate 0.1% may be used on chronic dermatoses on extremities. Used for limited periods only on face and/or intertriginous areas of adults and children, under close supervision and follow-up. Potential for local side effects with prolonged use.
Group 3 (potent)	(Betamethasone dipropionate 0.05%, Halcinonide 0.025%-0.1%) To be used on recalcitrant chronic dermatoses of adult-elder children only. Can cause local or systemic side effects.
Group 4 (super potent)	(Clobetasol propionate 0.05%) To be used for limited period of time (2 week at a time) as the risk of side effect is highest. Use only in extremities and thickened skin lesions. To be used only when follow-up/supervision is good. Not to be used on face/fl exures or in infants/neonates.

*Note: Lotion preparation of some salts at identical concentration is less potent than cream, which is less active than the ointment of the same salt at the same concentration.

2. **Systemic treatment**

Tab. Pheniraminemaleate 25mg 2 times a day till symptoms subside (about 7 days).

In children 0.5mg/kg/day in 3 divided doses.

(Caution: side effect dry mouth).

Or

Tab. Cetirizine 10mg at bedtime till symptoms subside.

In children Syr. Promethazine 1mg/kg/day 3 times a day till symptoms subside

(about 7 days) or Syr. Cetirizine 0.3mg/kg/day once daily till symptoms subside.

3. **Secondary bacterial infection**

It should be treated in the acute stage with systemic antibiotics (see section on bacterial skin infections).

If there is no response or in case of extensive eczema (preferably under the supervision of a specialist) give, Tab.Prednisolone 1mg/kg (maximum 60mg) as a single oral dose given in the morning after breakfast for 7-10 days. This should be tapered and withdrawn as early as possible after relief from symptoms and signs.

References

1. Eczema, Lichenification and Prurigo. In: Textbook of Dermatology. Champion R H et al (eds), 6th Edition, Blackwell Science Ltd. ,London; pp 629.
2. Topical Glucocorticoids. In: Dermatology in General Medicine, Fitzpatrick T B et al (eds), 5th Edition, McGrawHill Company Inc., NewYork.
3. Topical Therapy.in: Textbook of Dermatology. Champion R H et al .(eds),6th Edition, Blackwell Science Ltd.,London; pp3547.

MILIARIA

Miliaria is caused by obstruction of the sweat gland duct during hot humid summer seasons.

Clinical Features

Itching, stinging and secondary infection can occur and lead to perioritis (multiple staphylococcal abscesses) superimposed on miliaria rubra in young children. Eczematization can occur.

Treatment

Nonpharmacological

- Avoid causal factors like heat and occlusion due to oils, creams, cosmetics etc.
- Cool baths and aeration.

Pharmacological (miliaria rubra)

1. Emollients like anhydrous lanolin or Calamine lotion locally.

Or

Talc or any commercially available powders.

2. In case of secondary infection (see section on bacterial skin infections).
3. For relief of itching Tab. Pheniramine 25mg 2 times a day.

ACNE VULGARIS

Chronic inflammatory condition of the pilosebaceous glands of the face, neck and upper back. Usually occurs in adolescents and young adults. Two types of lesions

- Non-inflammatory (comedones: blackheads or white heads)
- Inflammatory: pustules, nodules, cysts and abscesses.

Treatment

Nonpharmacological

Washing/cleaning of face to keep skin non-sticky, dry and dirt free; shampooing to keep scalp non-greasy.

Pharmacological

Non-inflammatory acne. Retinoic acid cream/gel (0.025%; 0.05%) usually applied once a day – at

bedtime or alternate day. A therapeutic response appears characterized by redness and scaling within 3-6 weeks. Treatment is usually continued for atleast 3 months.

(Caution: Not to apply near/into eye/mouth; contraindicated in pregnancy and lactation)

Gel Retinoic acid if not tolerated maybe substituted by Adapalene 0.1% gel

(usage and precautions same as above).

Or

Cream/gel Azelaic acid 20% applied once or twice a day after face-wash. Inflammatory acne. Inflammatory acne treatment may need to be combined with treatment for non-inflammatory acne.

Mildcases. As above.

Clindamycin gel 1% to be applied twice a day(or more) for 4-6 weeks.

Or

Erythromycin gel/lotion 2%; 4% (safe in pregnancy) to be applied twice a day (or more)for4-6 weeks. Begin with the lower strength.

Or

Benzoyl peroxide gel 2.5%, 5% (safe in pregnancy) to be applied to clean skin initially once daily on alternate days then twice a day (or more) for 4- 6weeks.

Moderate to severe cases should be referred to a specialist preferably without treating with systemic antibiotics.

1. Topical therapy as above (same drug should not be used topically as well as systematically as no extratherapeutic benefit will result).
2. Cap. Doxycyclin 50-100 mg once daily for 4-12 weeks. The dosage can be reduced in accordance with the clinical response and discontinued.

Or

Tab. Azithromycin 500mg OD for three consecutive days (repeat every three days on same days).

Treatment may need to be continued for upto 6 months. Severe and unresponsive cases should be referred to a tertiary care hospital.

References

1. Disorders of the Sebaceous Glands. In: Textbook of Dermatology, Champion R H et al.(eds), 6thEdition, Blackwell Science Ltd., London, pp1940.
2. Disease of the Sebaceous Glands. In: Dermatology in General Medicine. Fitzpatrick T B et al (eds), 5thEdition, McGrawHill Company Inc., New York, pp769.

ALOPECIA AREATA

Alopecia areata is presumed to be an immunologically mediated disorder characterized by nonscarring patchy loss of hair.

Treatment

1. Topical agents may stimulate localized hair growth. Hydrocortisone acetate ointments or cream 1% applied 1 to 4 times or Fluticasone propionate 0.1% applied once a day as thin film and frequency of application is reduced when response is observed. Application is stopped as soon as lesions resolve.

See Table 14.2 in section on eczema use Group 2 and 3 topical steroid.

2. Retinoic acid 0.5% \

Or

Intralesional Triamcinolone 10mg/ml 0.2-0.5 ml per patch every 3 weeks
(should be treated by a specialist).

PUVA therapy is sometimes effective in unresponsive cases. In patients with extensive hairloss, a wig or partial hair piece provides a more satisfactory solution.

Reference

1. Drugs used in Skin Diseases, WHO Model prescribing information WHO, Geneva, 1997.

PITYROSPORUM INFECTIONS OF THE SKIN

Tinea versicolor and Pityriasis capitis (Dandruff) caused by fungus *Malassezia furfur* & *Pityrosporum ovale*.

Clinical Features

- Superficial, scaly, hypo or hyperpigmented, irregular macules most often occurring on the trunk and proximal extremities.
- Pityriasis capitis (dandruff) presents as diffuse itchy lesions over the scalp with hairloss; maybe associated with erythema, scaly lesions over eyebrows, eyelashes and nasolabial fold.

Treatment

To avoid oil application.

Pharmacological

1. Topical 2.5% Selenium sulfide lotion/shampoo.

Or

Topical Ketoconazole 2% lotion (shampoo in dandruff), apply once for 15 minutes before taking bath on affected areas daily till controlled then reduced to 2-3 times per week,

Or

Zinc Pyrithione 1% apply once for 15 minutes before taking bath on affected areas daily till controlled then reduced to 2-3 times per week.

2. In facial lesions (Tinea versicolor),

Topical Miconazole 2% cream apply twice daily for several weeks.

Or

Topical Clotrimazole 1% cream.

3. 3 Tab. Fluconazole 400 mg as a single dose (can be combined with topical therapy for faster relief). Tab. Fluconazole 150mg weekly for 4-6 weeks maybe given to prevent early relapse.

PITYRIASIS ALBA (PATCHY HYPOCHROMIA)

Pityriasis alba affects over 80% children, its aetiology is obscure.

Treatment

1. The topical preparations (emollients) should be applied at night and washed off in the morning. The treatment is maintained for 4-6 weeks.
2. Hydrocortisone -17 butyrate ointment or cream 0.1% apply thin layer of cream on the affected skin twice daily until symptoms resolve.

ACUTE URTICARIA

Urticaria (hives) is an on specific vascular response to a wide variety of stimuli .Acute urticaria presents with erythematous wheals, which may be associated with swelling of loose connective tissue (angioedema) affecting lips, face, scrotum, larynx and trachea.

Treatment

Nonpharmacological

Soothing applications- cold water sponging and clearance of airway in case of laryngeal oedema.

Pharmacological

Tab.Pheniramine maleate 25 mg 3 times a day for 1-2 weeks.

In children 0.15mg/dose in 3or4 times a day. The dosage should be adjusted according to response and tolerance.

Or

Tab.Hydroxyzine 10-25 mg 3 times a day.

Or

Tab.Cetirizine 10mg once daily.

In children 5 mg once daily.

In severe cases, antihistaminics can be started intravenously and once controlled, patient is maintained on oral preparations as above.

Angioedema of the larynx is a medical emergency

Inj. Epinephrine in 0.5-1.0 ml of 1:1000 IM. Patients with severe airway obstruction may have to be intubated immediately (for details see section on anaphylaxis in chapter 2).

CUTANEOUS REACTIONS TO DRUGS

Drug eruptions may follow the use of topically or systemically administered drugs.

Treatment

Stop the suspect drug, . Treatment is symptomatic in a mild case. However, in severe drug eruptions such as exfoliative dermatitis and generalized bullous reactions, systemic corticosteroids may be required.

CHICKEN POX OR VARICELLA

Varicella is caused by *Varicella zoster* virus (VZV) and is transmitted by droplet infection. The incubation period is about 14 days. Reactivation of disease results in Herpes zoster or Shingles.

Treatment of varicella is discussed in Chapter 19.

HERPES ZOSTER (SHINGLES)

Herpes Zoster occurs due to reactivation of VZV which lies dormant in sensory nerve root ganglion following primary infection as chickenpox

Clinical Features

- Grouped vesicular lesions on an erythematous base in a dermatomal distribution with severe localized pain.
- Thoracic segment and trigeminal nerve area is more commonly involved; involvement of ophthalmic division of trigeminal nerve (eruptions in the ophthalmic area including tip of nose) may lead to corneal ulcers and scarring.
- Post-herpetic neuralgia defined as persistence of pain for more than 1 month after healing of zoster, motor nerve involvement leading to paralysis of facial muscles, ocular muscles and bladder can occur.
- Lesions in immunocompromised and HIV patients may involve multiple dermatomes and course of the disease is painful and prolonged.

Treatment

Nonpharmacological

Rest and isolation alone in case of mild disease in an otherwise healthy person.

Pharmacological supportive therapy

1. Tab. Ibuprofen 400 mg 3 times a day till resolution of symptoms
In children: 10 mg/kg/day.

Or

- Tab. Nimesulide 100 mg 2 times a day in adults till resolution of symptoms
2. Tab. Pheniramine 25 mg 2 times a day till resolution of symptoms
In children: 0.5 mg/kg/day every 8 hours.
3. Calamine lotion topically till resolution of symptoms.

Pharmacological definitive therapy

When patient reports within 24-72 hours or has disseminated lesions

Tab. Acyclovir 800 mg 5 times a day for 5-7 days.

In children: 80 mg/kg/day in 5 divided doses.

Or

Tab. Famcyclovir 250 mg three times a day or 750 once daily for 7 days.

Refer immediately to a tertiary care hospital in case of hearing defect and facial palsy, immunocompromised patient (HIV/AIDS and patients with chronic debilitated disease),

involvement of ophthalmic division, and non-responders for following treatment: Inj. Acyclovir 10 mg/kg IV 8 hourly for 5-7 days.

HERPES SIMPLEX

Herpes simplex is the commonest infection caused by DNA virus, *Herpes virus hominis* (HSV). Type 1 is classically associated with facial infections and type 2 is typically genital. Transmission occurs by direct contact or droplets from infected secretions. Incubation period is 4-5 days.

Clinical Features

- Grouped vesicular lesions on erythematous base are present on lips or tongue, palate and mucous membranes (herpetic gingivostomatitis) or anywhere else on the body.
- Primary episode is painful and associated with regional tender lymphadenopathy.
- Recurrent episodes are relatively asymptomatic.
- Complications include disseminated herpes simplex in debilitated and immunosuppressed patients, herpetic encephalitis or meningitis, eczema herpeticum in patients with atopic dermatitis and erythema multiforme.

Diagnosis- by Tzanck smear made from a vesicle, on Giemsa staining it shows multinucleated giant cells and ballooning degeneration of keratinocytes.

Treatment

Supportive therapy in herpes labialis

A. **Mild case** is self limiting (5-7 days) and no specific therapy is required.

B. **Moderate to severe case.**

Tab. Acyclovir 200 mg 5 times a day for 5 days.

Prophylaxis (Recurrent episodes more than 6 per year, Refer to a specialist)

Tab. Acyclovir 400 mg 2 times a day Or 200 mg 3 times a day for 6 months to 1 year and, in addition, continue supportive therapy.

References

1. Viral Infections. In: Textbook of Dermatology. Champion RH et al. (eds), 6th Edition, Blackwell Science Ltd, London, pp 1008.
2. Herpes Simplex. In: Dermatology in General Medicine. Fitzpatrick TB et al (eds), 5th Edition, McGraw Hill Company Inc., New York, pp 2414.

MOLLUSCUM CONTAGIOSUM

A common pox virus infection of early childhood, transmitted by contact. In adults, Infection can be transmitted sexually. Incubation period varies from 14 days to 6 months.

Clinical Features

- Lesions are usually multiple and distributed on exposed areas and individual lesion is shiny, pearly white, hemispherical papule with central umbilication.
- Central core contains a cheesy material.

- Untreated lesions usually get cleared following local inflammation in 6 to 24 months.

Treatment

Nonpharmacological

Do not share towels/clothing.

Pharmacological for extensive lesions

Extirpate molluscum body and touch the central core with Trichloroacetic acid (TCA) 10% to 20%.

Adult patients with genital molluscum or extensive molluscum should be screened for STD and immunosuppression.

References

1. Viral Infections. In: Textbook of Dermatology. Champion RH et al. (eds), 6th Edition, Blackwell Science Ltd., London, pp 1005.
2. Molluscum Contagiosum. In: Dermatology in General Medicine. Fitzpatrick TB et al (eds), 5th Edition, McGraw Hill Company Inc., New York, pp 2478.

VIRAL WARTS

Human papilloma virus (HPV) causes viral warts. Transmission occurs by inoculation of infected material in breaches in skin or mucous membranes. Incubation period varies from 1 to 4 months.

Clinical Features

- Different clinical patterns viz. common warts (verruca vulgaris), palmoplantar warts, plane warts (verruca plana) and filiform warts commonly found in the beard area of an adult male.
- Lesions are asymptomatic except plantar warts, which may be painful.
- Genital wart is a sexually transmitted disease.

Treatment

1. Paring of the lesion.
2. Application of chemical cauterizing agent like 25-50% Trichloroacetic acid (TCA).

For genital warts (to be given by the treating physicians)

Podophyllin 20-25% in Tr. Benzoic Co. applied locally (after covering the surrounding normal skin with vaseline) weekly till complete resolution. To wash the affected area after four hours.

Or

Electrocautery/Cryosurgery.

References

1. Warts. In: Dermatology in General Medicine. Fitzpatrick TB et al (eds), 5th Edition, McGraw Hill Company Inc., New York, pp 2484.
2. Viral Infections. In: Textbook of Dermatology. Champion RH et al. (eds), 6th Edition, Blackwell Science Ltd., London, pp 1005.

LICHEN PLANUS

Lichen planus is a symptom complex of itching and self-limited eruptions which can involve the glabrous skin, mucous membrane, hair and nails. Usual course is of 9-18 months.

Clinical Features

- Violaceous polygonal papules, intensely pruritic plaques over the skin and grayish white streaky (Lacy pattern) mucous membrane lesions.
- Drugs causing lichenoid eruptions are - captopril, allopurinol, beta-blockers, gold, tetracycline, arsenic, penicillamine, NSAIDs, INH, chloroquine, carbamazepine.

Treatment

1. Topical Corticosteroids (Group 4: super potent; for details see Table 14.2 in section on eczema and dermatitis) ointment.

Or

In hypertrophic lesions: intralesional Triamcinolone acetonide injections given every 2-3 weeks till the lesions flatten.

2. In case of extensive lichen planus interfering with the patient's normal life, nail atrophy and pterygium formations, extensive ulcerative lesions of mucous membrane, follicular lichen planus of scalp and bullous lichen planus: Tab. Prednisolone (1 mg/kg) maximum 60 mg daily as single dose in the morning for 6 weeks and thereafter gradually tapering over a period of another 6 weeks.

Or

Tab. Dapsone 100 mg once a day.

3. If itching: Tab. Pheniramine 25 mg 3 times a day.

Duration of the treatment is usually 3-6 months.

Reference

1. Textbook of Dermatology. Champion RH et al. (eds), 6th edition, Blackwell Science Ltd., London; pp 1015.

PSORIASIS

Psoriasis is a common, genetically determined, inflammatory and proliferative disease of the skin characterized by chronic, red scaly plaques, particularly on the extensor prominences and on the scalp.

Clinical Features

- Asymptomatic erythematous, well-defined, dry scaly papules and plaques of various sizes.
- Grattage (Scratch) test: scales can be removed in layers (similar to one scratching a wax candle).
- Auspitz sign: when the scales are completely scraped off, multiple bleeding points are seen.
- Koebner phenomenon - lesion produced at trauma sites.

Treatment

Nonpharmacological

Identify and avoid triggering factors.

Pharmacological

Patient having greater than 10% body involvement should be referred to a tertiary care level.

Avoid systemic corticosteroids.

1. Tar (6% in white vaseline) - applied topically at bed time except face and flexures followed by sun exposure next morning.

Or

Group 4 potent topical corticosteroids applied once daily, with or without occlusion till improvement occurs (Table 14.2).

2. Salicylic acid (3%) in white vaseline, a thin layer is applied daily which the lesions have resolved.
3. Tab. Erythromycin 500 mg 4 times a day for 1 week.

Or

Cap Amoxicillin 250-500mg 8 hourly for 1 week.

4. Cap. Vitamin A 50,000 units to 1 lac units daily for 3 weeks followed by one week break.
5. Tab. Pheniramine maleate 25 mg 3 times a day or any suitable alternative.

Refer to a tertiary care centre if patient shows no improvement in 6-8 weeks or develops pustular psoriasis, psoriatic arthropathy or erythroderma. In scalp psoriasis oil/lotion/Tar shampoo to be applied daily at night. Face and Flexural psoriasis Group 1 or 2 topical steroid (see section on eczema and dermatitis).

References

1. Psoriasis. In: Textbook of Dermatology. Champion RH et al (Eds.) 15899, 6th Edition. Blackwell Science Ltd., London.
2. Psoriasis. In: Dermatology in General Medicine. Irwin M. Freedberg et al (eds), 5th Edition, McGraw Hill Company Inc., pp 495.

VITILIGO

Vitiligo is a pigmentation disorder more common in people with certain autoimmune diseases including hyperthyroidism, adrenocortical insufficiency, alopecia areata and pernicious anaemia. May also be hereditary.

Clinical Features

- Depigmentation of the skin and hair is common in sun-exposed areas, including hands, feet, arms, face, and lips, armpits, groin, around the mouth, eyes, nostrils, umbilicus, and genitals.
- Additional depigmentation following periods of physical or emotional stress

Investigations

- Complete blood picture,
- Blood sugar,

- Liver function test,
- T3 T4 TSH.

Treatment

Pharmacological

Therapy for vitiligo takes 6 to 18 months. The choice of therapy depends on the number of white patches and how widespread they are and on the patient's preference for treatment. Each patient responds differently to therapy.

1. Topical Group 2-4 steroid for 4 to 6 months depending on the sites involved (for details see Table 14.2 in a section on eczema and dermatitis).

Or

Topical psoralen photochemotherapy.

Or

Tab. Methoxsalen (10 mg) 0.4-0.6 mg/kg administered 2 hours before exposure to ultraviolet radiation. 12-24 sessions are usually necessary. The sessions should be given 2 or 3 times weekly (at least 48 hours apart).

2. Depigmentation of the unaffected area if greater than 90% area is already affected to get uniformity in colour.
3. Surgical therapies (at tertiary care level)

Autologous skin grafts, skin grafts using blisters, micropigmentation (tattooing), Autologous melanocyte transplants. Cosmetics that cover the white patches improve their appearance and help patients to feel better about them.

MELASMA

Melasma often appears during pregnancy in women living in dry, sunny climates, but is most frequently seen in those taking oral contraceptives.

Treatment

Avoid oral contraceptives

And

Depigmenting agent hydroquinone 5% lotion/cream once daily topically

Or

Glycolic acid 6-12% cream once daily

Or

Azelaic acid 10-20% cream once daily

Sunscreens containing either cinnamates or benzophenones a sun protection factor (SPF) rating of at least 15,

Or

Topical preparations containing Calamine, Zinc oxide, Titanium dioxide or other constituents which reflect incident light (physical sunblock) can also provide useful protection when they are applied carefully.

ALBINISM

Albinism is an autosomal recessive inherited disorder. Patients are at risk of skin damage from sunlight and usually develop cutaneous malignancies at an early stage.

Treatment

There is no effective therapy other than total avoidance of direct sunlight from early childhood.

Sunscreens to be given under the supervision of a specialist.

Reference

1. Drugs used in skin diseases, WHO Model Prescribing Information WHO, Geneva, 1997.

DERMATOLOGICAL EMERGENCIES

Serious emergencies involve blisters and erosions covering large areas of skin with toxic symptoms like fever, tachycardia, tachypnoea and dehydration. These patients require urgent referral to a specialist centre.

Three broad groups are:

Group I. Extensive blistering and erosions, e.g. pemphigus, toxic epidermal necrolysis, Stevens Johnson Syndrome.

Group II. Extensive skin involvement without blisters - erythroderma, viral exanthems, drug rashes.

Group III. Localized skin lesions - cellulitis, necrotizing fascitis.

Treatment

Group I

Pemphigus, Toxic epidermal necrolysis, Stevens-Johnson syndrome.

Nonpharmacological (general)

1. Identify the causative factor and stop exposure immediately.
2. Dressing (see section on burns in Chapter 2).
3. IV fluid replacement as per grade III burns depending on the area affected (see section on burns).
4. Care of eye and mucous membranes: Clean eye lesions by irrigation with normal saline and frequent change of position in bed (see section on eye infections in chapter 13).
5. If oral candidiasis (see section on acute oropharyngeal candidiasis in Chapter 6).

Pharmacological

Systemic antimicrobial therapy may be needed for patients with secondary infections (see section on bacterial infections).

Topical applications with Povidone iodine cream/lotion.

Or

Silver sulfadiazine cream.

Or

Silver nitrate sol 0.5% compresses soaked in a 1:100 dilution of the stock solution

are applied every 4 hours.

For erosions in mucosa. Providone iodine mouth wash.

For erosions in eye. Antibiotic eye drops (e.g. Ciprofloxacin eye drops 6 hourly).

Specific measures. Systemic immunosuppressivetherapy to be decided by the specialist.

Group II

Non-bullous skin eruptions (erythroderma, viral exanthems, drug rash)

Nonpharmacological

Bath with soap and water, high protein diet and to maintain normal body temperature and hydration.

Pharmacological

1. Tab. Pheniramine maleate 25 mg 3 times a day for duration of symptoms.
2. Emollients like white vaseline or coconut oil.

After initiating the above therapy patient may be referred to a specialist for further management.

Group III

Localized skin lesions (cellulitis, necrotizing fascitis)

For management of cellulitis (see section on cellulitis and erysipelas) and irritant dermatitis (see section eczema and dermatitis).

SEXUALLY TRANSMITTED DISEASES (SYNDROMIC APPROACH)

Syndromic approach is to follow diagnostic logic and provide tool to health workers.

Treatment

Uncomplicated gonococcal urethritis

Tab. Azithromycin 2 g orally as a single dose (for both gonococcal and chlamydial infections).

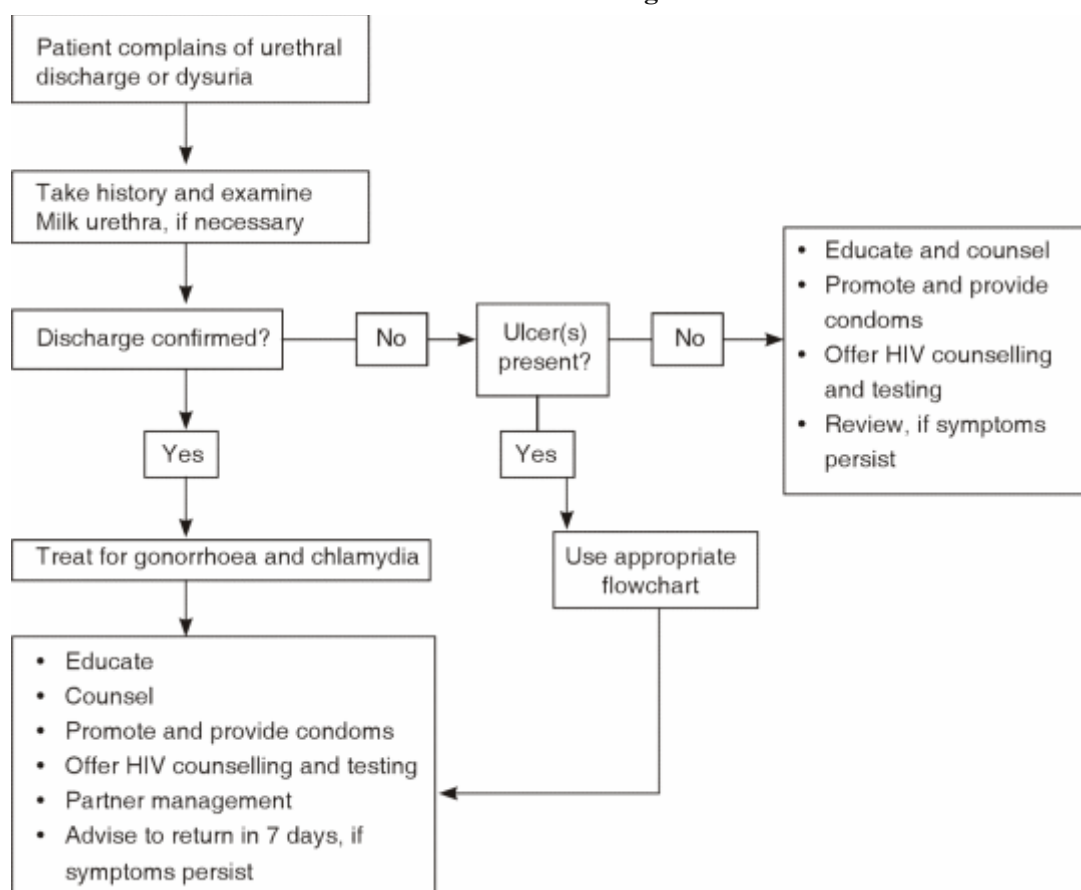
Or

Tab. Cefixime 400 mg orally as a single dose

Or

Inj. Ceftriaxone 250 mg IM as a single injection

1.Urethral Discharge



Flowchart14.1.Algorithmic approach to urethral discharge.

Table 14.3. Syndromes, kits for treatment of syndromes and their contents.

Kit No	Syndrome	Colour	Contents
Kit 1	Urethral discharge, anorectal	Grey	Tab. Azithromycin 1 g (1) and Tab. Cefixime 400 mg (1)
Kit 2	Vaginal discharge	Green	Tab. Secnidazole 2 g (1) and Tab. Fluconazole 150 mg (1)
Kit 3	Genital ulcer disease—non-herpetic	White	Inj. Benzathine penicillin 2.4 MU (1) and Tab. Azithromycin 1 g (1) and Disposable syringe 10 ml with 21 gauge needle (1) and Sterile water 10 ml (1)
Kit 4	Genital ulcer disease—non-herpetic, for patients allergic to penicillin	Blue	Tab. Doxycycline 100 mg (30) and Tab. Azithromycin 1 g (1)
Kit 5	Genital ulcer disease—herpetic	Red	Tab. Acyclovir 400 mg (21)

Kit No	Syndrome	Colour	Contents
Kit 6	Lower abdominal pain	Yellow	Tab. Cefixime 400 mg (1) and tab. Metronidazole 400 mg (28) and Cap. Doxycycline 100 mg (28)
Kit 7	Inguinal bubo	Black	Tab. Doxycycline 100 mg (42) and Tab. Azithromycin 1 g (1)

Chlamydial urethritis or cervicitis

Tab. Azithromycin 2 g orally as a single dose (for both gonococcal and chlamydial infections).

Or

Cap. Doxycycline 100 mg orally twice daily for 7 days.

(Caution: Doxycycline is contraindicated during pregnancy).

Or

Tab. Erythromycin base/erythromycin stearate 500 mg orally 8 hourly for 7 days

Treatment of cervical discharge (cervicitis)

A. *Treatment of Gonococcal cervicitis and chlamydial cervicitis*

Same as in urethral discharge.

B. *Trichomoniasis*

Tab. Metronidazole, 2g orally in a single dose/metronidazole 400mg orally twice daily for 7 days.

Or

Tab. Tinidazole, 2g orally in a single dose.

C. *Bacterial vaginosis*

Tab. Secnidazole 2 g orally in a single dose.

Or

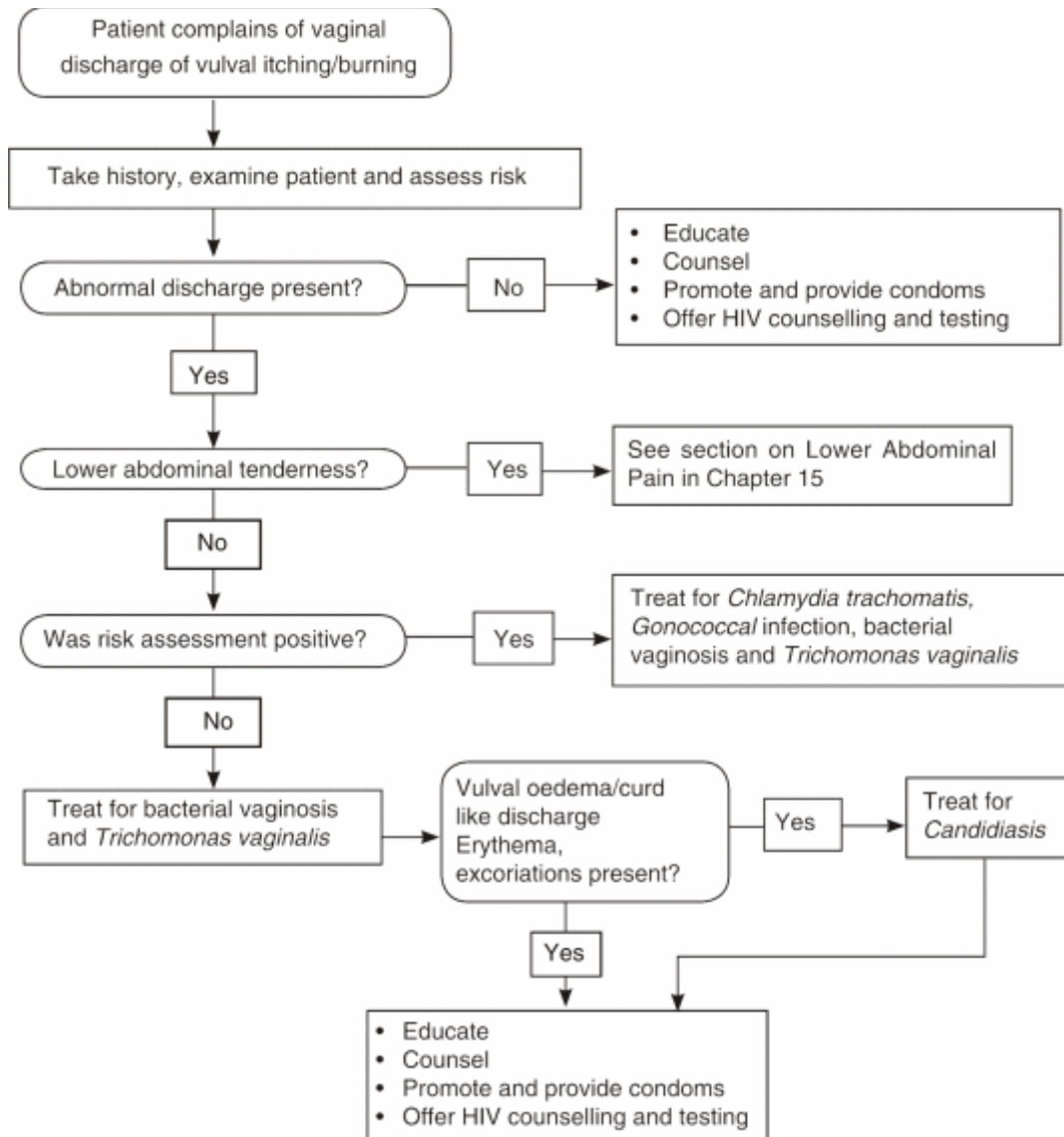
Tab. Metronidazole 2 g orally in a single dose/ metronidazole 400 mg orally twice daily for 7 days.

Or

Tab. Tinidazole 2 g orally in a single dose.

However, in symptomatic woman, in the first trimester and those intolerant to metronidazole/tinidazole, imidazole pessaries/cream may be given for 7 days.

2. Vaginal Discharge



Flowchart 14.2. Algorithmic approach to vaginal discharge without facilities for pelvic/speculum examination.

D. Vulvovaginal candidiasis

Cap. Fluconazole 150 mg orally as a single dose.

(**Caution:** Safety in pregnancy is not established).

Or

Clotrimazole 500 mg vaginal pessary intravaginally as a single dose.

Or

Miconazole/Clotrimazole 100 mg vaginal pessary intravaginally daily for 6 days.

Treatment of common aetiologies of genital ulcer

A. *Genital herpes (first clinical episode)*

Tab. Acyclovir 200 mg orally five times a day for 7 days or Tab. Acyclovir 400 mg orally 3 times daily for 7 days.

Recurrent infections

Tab. Acyclovir 200 mg orally 5 times daily for 5 days or Tab. Acyclovir 400 mg orally 3 times daily for 5 days or Tab. Acyclovir 800 mg orally twice daily for 5 days.

Suppressive therapy

In patients with six or more recurrences per year.

Tab. Acyclovir 400 mg orally twice a day continuously for at least 6 months to 1 year.

B. *Syphilis*

Early syphilis (includes primary, secondary and early latent infection up to 2 years duration).

Inj. Benzathine benzylpenicillin, 2.4 million IU deep IM in a single session (two equally divided doses in each buttock) after intradermal sensitivity test for penicillin.

Or

Inj. Procaine benzylpenicillin, 1.2 millions IU (3 vials, each having combination of 1 lakh units of benzyl penicillin G sodium plus 3 lakh units of procaine benzylpenicillin)

IM once daily for 10 days.

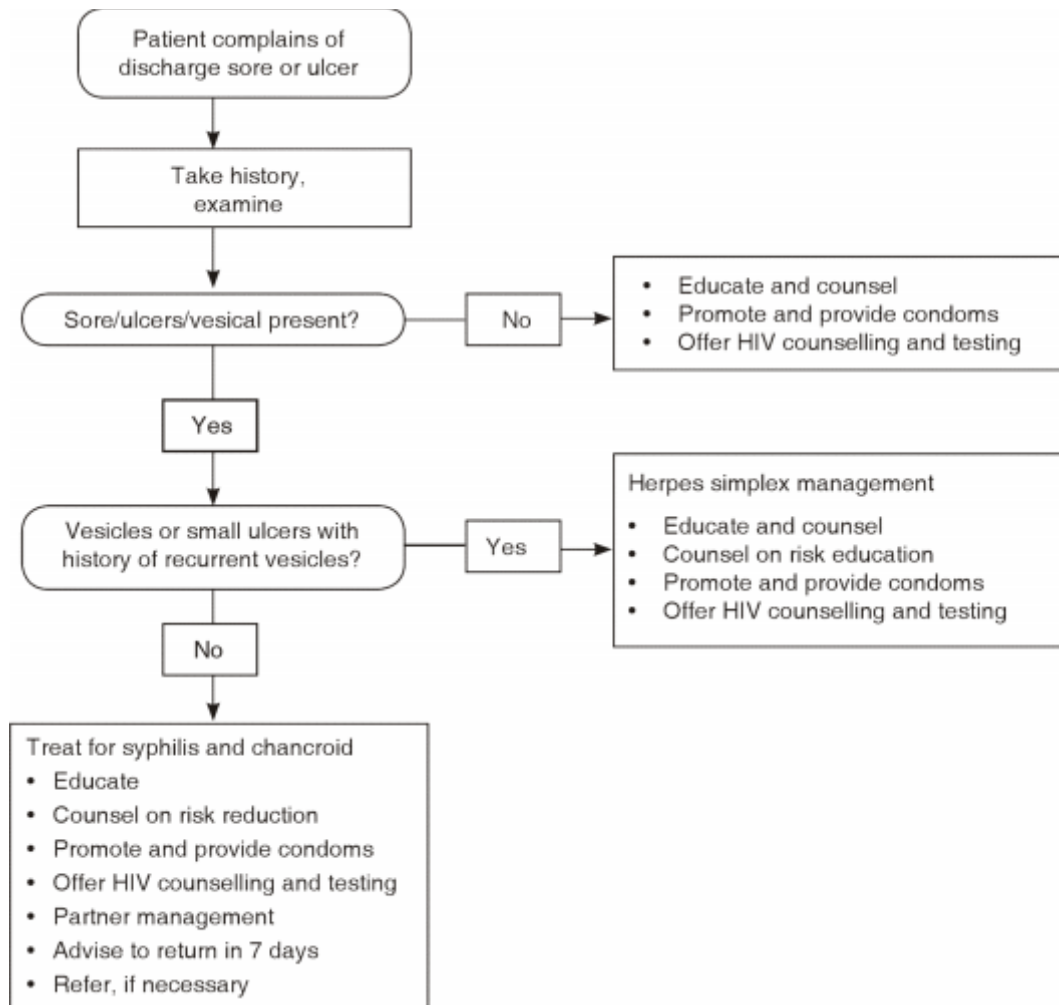


Figure 14.3. Algorithmic approach to genital ulcer.

Alternative regimes for penicillin hypersensitive, non-pregnant patients

Cap. Doxycycline 100 mg orally twice daily for 15 days.

Or

Cap. Minocycline 100 mg orally twice daily for 15 days.

Or

Tab. Azithromycin 1 g orally as a single dose.

Or

Tab. Tetracycline 500 mg orally 4 times a day for 15 days.

C. Chancroid

Tab. Azithromycin 1 g orally as a single dose.

Or

Inj. Ceftriaxone 250 mg IM as a single dose.

Or

Tab.Ciprofloxacin, 500mg orally twice a day for 3-5days or till clearance of lesions

Or

Cap.Doxycycline 100mg orally twice daily for 7 days.

Or

Tab.Trimethoprim (80mg) +sulphamethoxazole (400mg), 2 tab orally twice a day for 2 weeks.

IV.Inguinal Bubo

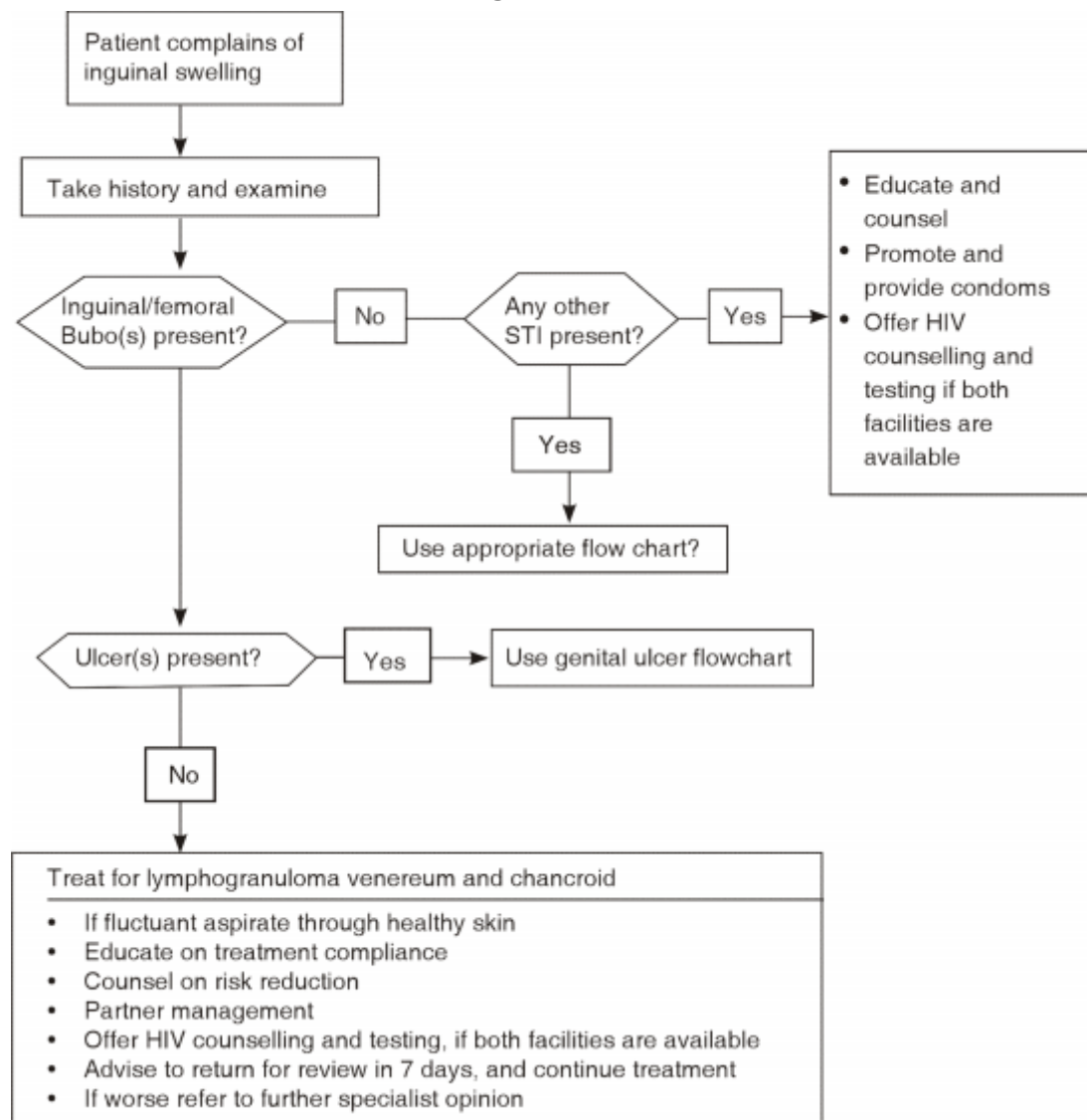


Fig.14.4 Lymphogranuloma venereum (LGV)- Algorithmic approach

D. *Candidal balanitis/balanoposthitis*

It presents as well defined irregular erythematous erosions over glans and prepuce; maybe associated with itching and whitish discharge which can easily be scraped off.

For treatment see candidiasis on page 263.

A. *Treatment of LGV (chlamydial infection)*

Cap.Doxycycline 100mg orally twice daily for 21days

Or

Cap.Tetracycline 500mg orally 4 times a day for 21days

Or

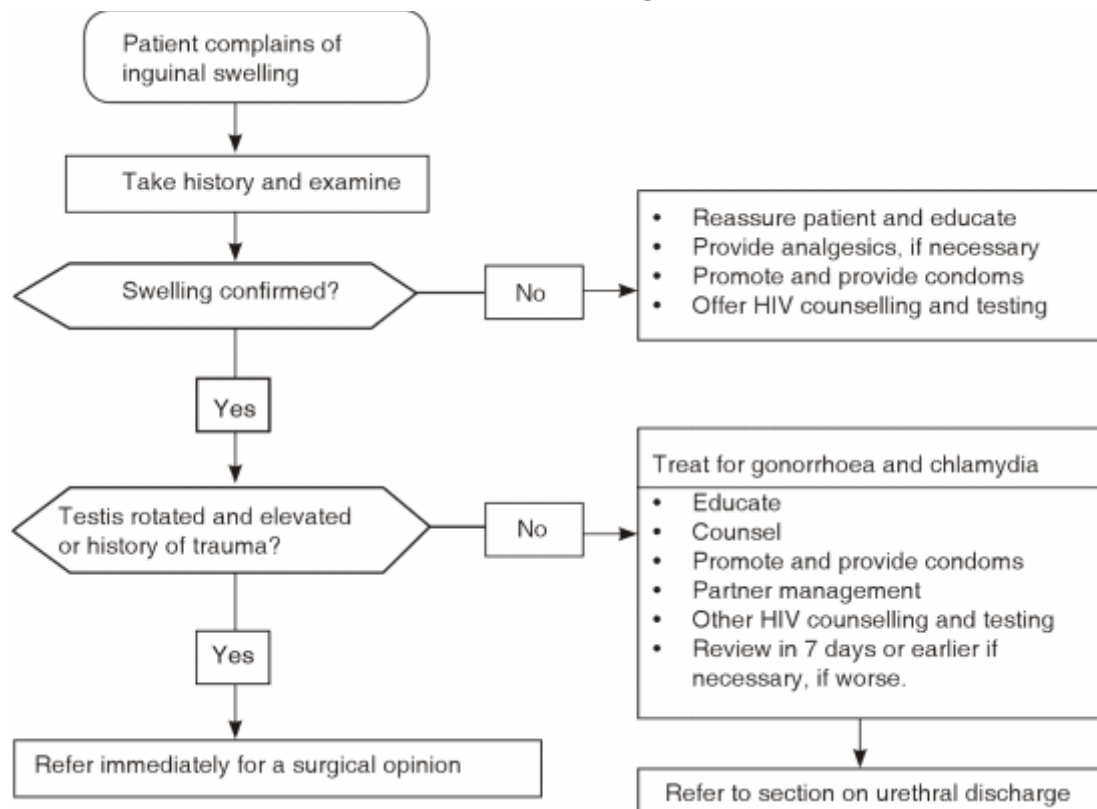
Tab.Trimethoprim (80mg)+ sulphamethoxazole (400mg) 2 tablets twice daily for 21days.

Or

Tab.Erythromycin stearate or base 500mg orally 4 times a day for 2 weeks.

B. *Treatment of chancroid, see genital ulcer treatment*

V.Scrotal Swelling



Flowchart 14.7. Algorithmic approach to scrotal swelling.

For treatment of epididmorchitis see Chapter18.

Lower abdominal pain

For lower abdominal pain see section on pelvic inflammatory disease (PID) in Chapter 15.

References

1. WHO. Guidelines for the management of sexually transmitted infection 2001. *WHO/RHRJO1*. 10.
2. NACO. STD Treatment Recommendations. 2002.
3. Campbell RL, Plumb J. The syndromic approach to treatment of sexually transmitted diseases in low income countries, issues, challenges and future directions. *J Obstet Gynaecol Can* 2002; 24:417-424.
4. Sexually Transmitted Infections In: Gynaecology, Robert W Shaw, W Patrick Soutter, Stuart L Stanton

CHAPTER 15

OBSTETRICS AND GYNAECOLOGY

NORMAL PREGNANCY

Antenatal care

Instruct the woman regarding

1. **Diet.** The increased requirement of 300 Cals should consist of at least half-a-liter if not one liter of milk, plenty of green leafy vegetables (one katori serving in each meal) & fruits as available, in addition to normal Indian diet consisting of a balanced cereals and pulses combination. Foods rich in iron like green vegetables, jaggery, and protein rich foods like nuts should be stressed upon. Fat consumption can be predominantly of animal source so as to take care of vitamins A & D.

2. **Exercise** No new exercise should be initiated during pregnancy. Sedentary women should be allowed only walking. Women with multiple foetuses and complications like heart disease, pregnancy induced hypertension, intrauterine growth retardation, history of preterm labour, APH, threatened abortion should not exercise.

3. **Clinical workup** during each antenatal visit.

- Pulse
- Respiratory rate
- Blood Pressure
- Weight-gain
- Oedema
- Cardio-vascular, respiratory and breast examination
- Symphyseal-fundal height
- Presentation
- Foetal heart rate(s)
- Amniotic fluid volume
- Inquiry about daily foetal movement charting
- Pelvic assessment at 38 weeks.

Rh-ve women (with Rh+v husband) need to be monitored on similar lines with

- Indirect Coomb's test(ICT) at first visit, 28 weeks and 34-36 weeks.
- Antenatal Anti Dimmunoglobulin 300 mcg IM is recommended in ICT negative patients at 28 weeks of pregnancy and postpartum 300 mcg IM if baby is Rh+ve.
- ICT +ve patients are to be managed only at centers with facilities for amniocentesis and/or cordocentesis, amniotic fluid optical density estimation and intrauterine foetal transfusions.

4. Women with history of neural tube defects should receive Tab. Folic acid 5 mg/d, at least 3 months before conception, and continue till 12 weeks of gestation. All other women should receive 0.5 mg/d in the first trimester.

5. Dose of iron (60-100 mg elemental iron) and folic acid (Tab. IFA) once daily and calcium gluconate 500 mg tablet twice daily from 16 weeks till 3 months postpartum.

9. Immunization. 2 doses of tetanus toxoid 4-6 weeks apart, (*mumps, measles and rubella vaccines are contraindicated*). Rest of the vaccines can be administered, if indicated as in nonpregnant state.

10. Lab workup during pregnancy as Table 15.1.

Table 15.1. Lab workup during pregnancy

Gestational age	Lab assessment
Initial (as early as possible)	Blood group and Rh typing – Haemoglobin – Random blood sugar – Urine (routine and microscopy) – Screen for syphilis – Hepatitis B infection screening – HIV screening after counselling (see pre- and Post-HIV Testing Counselling Section)
16-18 weeks	Ultrasound for foetal anomalies, if indicated
26-28 weeks	Haemoglobin – Diabetes screening – Urine for albumin and sugar
32-36 weeks	Ultrasound, if indicated* – Haemoglobin – Urine for albumin and sugar

Reference

1. Prenatal Care. In: Williams Obstetrics Eds F G Cunningham, N F Gant, K J Leveno, L C Gilstrap III, J C Hoth, K D Wenstrom, 21st edition, McGrawhill publication, International edition, 2001. pp 221-248.

NORMAL LABOUR

Normal labour is when foetus presents as vertex, starts spontaneously at term, terminates naturally without artificial aid and without complications. Broadly there are 3 stages of labour (Table 15.2).

Diagnosis of labour

- Painful uterine contractions at regular intervals with increasing intensity and frequency.
- Cervical dilatation and effacement.
- Formation of bag of membranes.
- Show.

Table 15.2. Stages of labour

Stages of labour	Definition	Duration	
		Nullipara	Multipara
First stage-Latent phase	Cervical dilatation less than 3cm	12h	8h
First Stage-Active phase	Cervical dilatation more than 3cm	6-8h or rate of Cx dilatation 1cm/h	4-6 h or rate of Cx dilatation 1.5cm/h
Second stage	Full dilatation of cervix to expulsion of foetus	1 h	30min
Third stage	From expulsion of foetus to the delivery of placenta	30min	15min
Fourth stage	Observation	1 hr	1 hr

Management of labour

When the patient reports to the hospital with labour pains, examination should be conducted by a doctor on duty and risk category to be assigned (Table 15.3).

Table 15.3. Common risk factors during labour

Maternal factors	Past reproductive history	Present pregnancy	Associated medical/surgical problems
Age <16, >35	>1 abortion	Bleeding in pregnancy	Heart disease
Parity- 0, >5	Previous still birth	Prematurity, PROM	Diabetes
Obesity	Previous caesarean section	Postmaturity	Anaemia
Height <145cm	Prev PPH/MRP PIH, Eclampsia TUGR Congenital anomaly in baby Previous early neonatal death	PIH IUGR Multiple pregnancy Malpresentation Malposition	Jaundice Hypertension Renal disease Thyroid disease Epilepsy Asthma

General examination

- Record height and weight. Pulse rate (PR), blood pressure (BP), respiratory rate (RR), temperature.
- Look for pallor, pedal oedema, jaundice and cyanosis.
- Auscultate cardiovascular and respiratory system.

Perabdomenexamination

Note:

- Height of the uterus versus period of gestation (POG)
- Presentation, attitude, palpable foetal head (rule of fifths).
- Size of the baby/estimated baby weight.
- Amount of liquor.
- Foetal heart rate.
- Uterine contractions – present or not, intensity, duration and frequency per 10minutes.
- Look for overriding of foetal head over symphysis pubis.
- Features of obstructed labour and contour of the uterus, tone of uterus

Per vaginum examination

Observe aseptic precautions – hand washing and sterile gloves.

Note:

- Cervical position and consistency
- Cervical dilatation and effacement.
- Presentation and station of presenting part.
- Position and degree of flexion (sutures and fontanelle).
- Status of membranes and (if leaking present) then colour of liquor.
- Cord prolapse or presentation to be ruled out.
- Pelvic adequacy and rule out cephalopelvic disproportion (CPD).

Investigations

Minimum investigations required during labour are:

- Hb
- Urine albumin and sugar,
- Blood grouping.
- Urine acetone in prolonged/obstructed labour.

First stage of labour

Supportive care.

- Sympathetic attitude towards the patient.
- Inform the patient about her status.
- Clip long pubic hair.
- No routine enema unless rectum is loaded or the patient requests.
- The patient is instructed to wear loose clothes.
- Allow mobility and let her choose position during labour.
- Encourage her to empty bladder frequently.

Nutrition

- Low-risk patient: Bland diet like fat-free dalia and khichri, glucose biscuits. Encourage her to drink plenty of fluids.
- Patients likely to need caesarean section: Clear fluids only
- IV line not mandatory
- IV line indicated for – fluid infusion in dehydration, vomiting.
- Fluid requirement during labour is 60-120 ml/h.
- Pain relief: To be given only in active labour, if required.

Inj. Tramadol 100 mg IM may be used, causes less respiratory depression, can be repeated after 4-8 h..

Antibiotics: No routine antibiotics.

Monitoring during labour. It is recommended for all patients (Fig. 15.1). Record of the patient should be meticulously maintained.

Complete details of the patient on the partograph.

Chart PR every half hourly, BP 4 hourly and temperature 12 hourly (more frequently if abnormal).

Contractions are recorded every half hourly - frequency (contractions per 10 min), intensity and duration.

Assess descent in terms of fifths of foetal head above pubic symphysis.

PVexam: should be done – at admission, every four hourly in active labour, at ROM or earlier if indicated.

Artificial rupture of membrane (ARM) if done, indication should be mentioned –note colour of liquor.

Using the partograph

- Start the partograph only when the woman is in active labour and does not have complication which needs immediate delivery.
- Record observations in all sections of partograph.
- The dilatation of cervix is plotted with 'X'.
- When the patient is admitted in active phase of labour, the dilatation of cervix is plotted on alert line and the clock time written directly under the 'X' in space for time.
- Vaginal examination should be done every 4 h after admission unless specifically indicated e.g. at ROM.
- If cervicogram moves to the right of alert line, it indicates prolonged labour and the patient should be reassessed.
- At action line, the woman must be carefully reassessed for reason of lack of progress and decision made on further management.
- The time of fetal heart abnormality and rupture membranes and its colour should be highlighted, using the following abbreviations:

Name:	W/o	Age:	Parity:	Reg. No..
Date and Time of Admission	Date and Time of RDM:			



Amniotic fluid

- I - Intact membranes
- C - Membranes ruptured; clear fluid
- M- Meconium stained liquor
- B - Blood stained liquor

Complete all the columns of partograph

- Partograph passes to the right of **Alert line** – reassess and consider criteria for referral; call senior person, if available.
- Partograph passes to the right of **Action line**– refer urgently to hospital unless birth is imminent.
- Foetal heart monitoring should be done by intermittent auscultation with help of stethoscope or foetoscope.
- Foetal heart rate(FHR) should be counted for 60 seconds following contraction (Normal FHR is 110-160 beats per minute).
- Frequency of FHR recording – every 30 minutes in first stage and every 15 minutes in second stage and every 5 minutes during pushing.
- Oxytocin if used, record amount of oxytocin in mU/min
- Drugs and IV fluids if administered are recorded.
- Maintain intake- output chart.

Second stage of labour

- Shift the patient to delivery table.
- Inform the paediatrician. Ensure all delivery equipment and supplies, including newborn resuscitation equipment, are available, and place of delivery is clean and warm (25°C).
- Put her in dorsal/squatting position.
- Observe universal precautions (for details see section on newborn care and prevention of infection in Chapter 19).
- Clean and drape the parts.
- Infiltrate the perineum with local anaesthetic agent if episiotomy is planned. Woman is encouraged to bear down.
- Episiotomy is given if required (See Episiotomy)
- To control birth of the head, keep the baby's head flexed and gently support the perineum as the head delivers. Suction of the nose and mouth.
- After external rotation, deliver the shoulders one at a time followed by rest of the foetus.
- Clamp and cut the umbilical cord.
- Ensure establishment of respiration in baby or institute resuscitation if required.
- Administration of oxytocin 5 Units IM at the delivery of the anterior shoulder to prevent PPH.

Third stage of labour

- Recognizes signs of placental separation: Uterus becomes globular and firmer,
- Suprapubic bulge appears, sudden gush of blood and permanent lengthening of cord.

- Deliver the placenta by controlled cord traction. As the placenta passes through the introitus, care is taken to prevent the membranes from being torn off and left behind.
- Examine the placenta for its completeness and anomalies.
- Administer Inj. Oxytocin 5-10 U IM.
- Active management of third stage should be done unless contraindicated.
- Examine the woman for any tears and repair if any. Stitch the episiotomy.
- Observe the woman closely for one hour after delivery, record her PR and BP.
- Evaluate the uterus frequently, and inspect the perineum to detect excessive bleeding and haematoma formation.

Transfer from labour room

- Observe for 2 hours
- Check the following before transfer: pulse rate, BP, uterus, bleeding per vaginum,
- Inspect external genitalia for condition of stitches and any haematoma, passed urine.

Care of episiotomy

- Perineal hygiene: Clean the area with antiseptic solution after urination and defaecation.
- Analgesics are prescribed for allaying pain.

Respond to following problems during labour and delivery

Assess facilities and expertise available and appropriate timely referral if

- Foetal heart rate <120 or >160 beats per minute
- Prolapsed cord
- Breech presentation
- Stuck shoulders
- Multiple births

Advice on postpartum care

- To always have someone near her for the first 24 hours to respond to any
- change in her condition.
- Not to insert anything into the vagina.
- To have adequate rest and sleep.
- The importance of hand washing to prevent infection of the mother and
- her baby.
- To wash perineum daily and after faecal excretion.
- To avoid sexual intercourse until the perineal wound heals.
- Counsel for birth spacing and family planning (for details see section on contraception).
- Advise on routine postpartum care visits- within the first week, preferably within 2-3 days and second visit after 4-6 weeks. Earlier if problems- fever, UTI, perineal infection, hypertension, urinary incontinence, severe anaemia, postpartum blues, HIV positive.

Counsel on exclusive breastfeeding

- Babies should start breastfeeding within 1 hour of birth. The baby should not be given any other food or drink before breastfeeding,
- Babies should be exclusively breastfed for the first 6 months of life.

(for care of the newborn and control of infection see chapter 19 and chapter 13).

References

1. Cunningham FG, Grant NF, Leveno KJ, Gilstrap LC, Hauth JC, Wanklin KD (eds.). In: *Williams' Obstetrics* 21st Edition. USA; McGraw Hill Publishers pp 309-330.
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3. Childbirth. In: *A guide to effective care in pregnancy and childbirth*, Enkin MW, Keirse *MNC*, Neilson JP, Corther CA, Duley L, Hodnett ED, Hofmeyr GJ (eds), 3rd Edition UK: Oxford Medical Publications 2000; pp 247-312.
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8. Normal Labour, Episiotomy, Perineal tears. In: *Obstetric Protocols for Labour Ward Management*. Rathore, Sachdeva, Batra (eds), Jaypee Brothers, Delhi 2004, pp 3-13.
9. *Integrated Management of Pregnancy and Childbirth. Pregnancy, Childbirth, Postpartum and Newborn Care*. Department of Reproductive Health and Research, Family and Community Health, World Health Organization, Geneva, 2003.

CONTRACEPTION

A method or a system, which allows intercourse and yet prevents conception, is called a contraceptive method.

I. Temporary contraceptive methods

A. (i) Combined oral contraceptive pills

- Any of the low dose combined oral contraceptive pill containing 30 mcg Ethinyl
- oestradiol and a Progestin (0.3 mg Norgestrel or 0.15 mg Norgestrel or 0.15 mg
- Desogestrel) can be prescribed.
- One tablet to be taken daily with meals at consistent time. It should be started during first seven days of the menstrual cycle or at any other time when it is reasonably certain that she is not pregnant.
- If started after first 7 days of menstrual cycle, back up method (abstinence or barrier method) should be used for 7 days.
- Pills should be taken for three weeks followed by 1 week of pill-free interval during which placebo tablets are to be taken if pack contains 28 tablets.

- In women >40 years of age very low dose pills containing Ethinyl oestradiol 20 mcg and Desogestrel 0.15 mg can be used.

Contraindications

- Thromboembolic disease,
- Cerebrovascular disease,
- Coronary artery disease.
- Complicated valvular heart disease
- Acute liver disease.
- Current or past breast cancer.
- Undiagnosed vaginal bleeding.
- Pregnancy.
- Heavy smokers over 35 years of age.
- Migraine with neurological symptoms.
- Diabetes >20 years or with vascular disease.
- Current gall bladder disease.
- Uncontrolled hypertension (bp >160/ 100).

Combined oral contraceptive pills should not be taken during first 6 months postpartum if breastfeeding and first 3 weeks postpartum in non-breastfeeding females.

Follow up. First follow up should be within 3 months and then annually. Follow up involves history, blood pressure, urinalysis, breast examination, liver palpation and pelvic examination.

A. Injectable hormonal contraceptives

Highly effective oestrogen free long acting contraceptive not linked to coitus; can be given in women where oestrogens are contraindicated like sickle cell disease, seizure disorders, age >35 years who smoke; can be given in breastfeeding females after first 6 weeks. In non-breastfeeding females, injections can be safely given immediately postpartum.

Depot Medroxy Progesterone Acetate - 150 mg injection to be given deep IM every three months. Next injection can be delayed by 2 weeks

Or

Norethisterone enanthate - 200 mg injection to be given deep IM every 2 months. Next injection can be delayed by 1 week.

Absolute contraindications

- Pregnancy
- Unexplained genital bleeding.
- Severe coagulation disorder.
- Previous sex steroid induced liver adenoma, active liver disease.
- Breast feeding during initial 6 weeks.
- Current or history of thromboembolic disease, cerebrovascular disease,
- Coronary artery disease.
- Current or past breast cancer

- Diabetes >20 years or with vascular disease
- Uncontrolled hypertension (bp >180/110).

B. Non-hormonal oral contraceptive pills (Centchroman)

30mg tablet started on first day of periods. Take twice weekly for three months and then continue as once weekly.

Contraindications Polycystic ovarian disease, cervical intraepithelial neoplasia, severe allergy, recent history of liver disease, and first 6 months of lactation.

C. Intrauterine contraceptive devices (IUCD)

Any of the following devices can be inserted inside uterus by trained health personnel. It should be inserted during or shortly after menstruation during the follicular phase of menstruation. After spontaneous or induced abortion IUCD can be inserted immediately. After delivery it should be inserted during 4-8 weeks postpartum. It can be inserted within 5 days of unprotected coitus. These devices need to be changed after the duration of their lifespan (Table 15.4).

Table 15.4 .Lifespan of intrauterine contraceptive devices (IUCD)

CuT200B	3years
Multiload 250	3years
Multiload 375	5years
CuT 380A	10years

Contraindications

- Pregnancy,
- Postpartum <4 weeks,
- Septic abortion,
- Distorted uterine cavity,
- Uterine fibroids,
- Current or within past 3 months PID or STD,
- Increased risk of STD,
- HIV positive, AIDS,
- Pelvic tuberculosis,
- Unexplained vaginal bleeding,
- Trophoblastic disease,
- Genital tract malignancy,
- Complicated valvular heart disease.

D. Barrier methods

Male condoms

Any of the available condoms can be used. For each act of coitus a new condom is to be used. If during intercourse, condom breaks or if there is spillage or leakage, woman should contact a clinician within 72 hours and emergency contraception should be provided to her.

Contraindication. Only contraindication is in cases with severe allergy to latex rubber.

Vaginal diaphragm

Available in different sizes. Proper size should be checked by a clinician by pelvic examination.

Can be inserted 6 hours prior to intercourse.

About a tablespoonful of spermicidal cream or jelly should be placed in the dome of diaphragm prior to insertion; should be left in place for approximately 6 hours (but not >24 hours) after coitus. Additional spermicide should be placed in vagina before each additional episode of sexual intercourse. After removal wash with soap and water, rinse and dry.

Follow up. Annually to assess proper fitting of diaphragm.

Contraceptive sponge

Contains spermicidal agent Nonoxynol 9. It should be removed at least 6 hours after sexual intercourse. Maximal wear time is 30 hours.

II. Permanent contraceptive methods

Male client should be <60 years of age.

Female client should be >22 years and <45 years of age.

Client must make informed decision voluntarily and must give consent on the consent form for sterilization.

A. Female sterilization

Can be done by laparoscopic ligation, interval ligation and first trimester abortions or tubectomy

Timing

- Interval sterilization - within 7 days after menstrual period is over.
- Postpartum sterilization - after delivery till 7 days but preferably within 48 hours. Later on after 6 weeks postpartum.
- MTP - concurrently.
- Spontaneous abortion - concurrently but under antibiotic cover and in the absence of infection and anaemia.

Contraindications

There are no absolute contraindications. Relative contraindications are

- Psychiatric disorder,
- Acute febrile illness,
- Jaundice,
- Hb < 8 g%,
- Chronic systemic disease,
- Malignancy,
- Bleeding disorder,
- Severe nutritional deficiency.

Postpartum sterilization is contraindicated in

- Puerperal sepsis or fever,
- Severe pre-eclampsia/eclampsia,
- Premature rupture of membrane >24 hours,
- Severe aph or pph,

- Genital tract trauma.

Post abortal sterilization is contraindicated in

- Sepsis,
- Fever,
- Haemorrhage,
- Severe trauma,
- Uterine perforation,
- Acute haematometra.

Follow-up. First follow up should be done seven days after the surgery for wound examination. Second follow up is recommended after one month or next menstrual period whichever is earlier. Subsequent follow-ups if client develops any complication or has query.

B. Male sterilization

Contraindications

There are no absolute contraindications. Relative contraindications include

- Psychiatric and physical illness,
- Local genital conditions, including large varicocele, hydrocele, inguinal hernia, filariasis, cryptorchidism,
- Previous scrotal surgery, intrascrotal mass.

Follow-up. First follow up after 7 days of surgery for wound examination and stitch removal. Second follow up after 3 months with semen analysis. Subsequent follow up required in cases of any complication or queries.

Emergency contraception

Method used to prevent pregnancy after a likely fertile unprotected act of sexual intercourse; can be used in cases of condom rupture, rape or other circumstances of unprotected sex.

First dose should be taken within 72 hours following unprotected sex and second dose 12 hours after the first dose. Any of the following can be used:

Levonorgestrel 0.75 mg 1 tablet 12 hourly for 2 doses.

Or

Combined oral contraceptive pills containing 50 mcg Ethinyl oestradiol with 0.5 mg Norgestrel 2 tablets 12 hourly for 2 doses.

Or

Low dose combined oral contraceptive pills containing 30 mcg Ethinyl oestradiol with 0.3 mg Norgestrel 4 tablets 12 hourly for 2 doses.

Reference

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NAUSEA AND VOMITING IN PREGNANCY

Nausea and vomiting is common from early pregnancy until about 16 weeks.

Clinical Features

- Vomiting on rising in the morning but sometimes occurs at other times of the day; vomitus is usually small and clear.
- Hyperemesis - weight loss, ketosis, muscle wasting, dehydration, postural hypotension and tachycardia.

Diagnosis is by exclusion of medical and surgical causes of vomiting like liver or GIT disorders, pyelonephritis, diabetes mellitus etc. and molar (and multiple) pregnancy should be ruled out in all cases of hyperemesis by ultrasound.

Treatment

Nonpharmacological

Reassurance and advice to take frequent small, dry carbohydrate rich meals and avoid fatty or spicy foods, especially avoid large volume of drinks in the morning.

A. Mild to moderate cases

Pharmacological

Tab. Doxylamine succinate 10 mg + Pyridoxine HCl 10 mg 1-2 tablets at bed time. If required one more tablet can be added in the morning and afternoon.

Or

Tab. Metoclopramide 10 mg 2-4 times a day in moderately severe cases.

B. Hyperemesis Gravidarum

Nonpharmacological

1. Admit all cases in the hospital away from a stressful home environment.
2. Stop oral intake of fluids and nutrition.
3. Serum electrolytes and urinary ketones to be checked at admission and 6 hourly.
4. Emotional support, psychiatric referral if required.
5. Rule out multiple or molar pregnancy and liver disorders.

Pharmacological

Adequate and appropriate fluid and electrolyte replacement. Normal saline or Ringer's lactate solutions are appropriate solutions and KCl is added as required. If urinary ketones are present, then 1 liter of 10% dextrose is transfused over 3-4 hours.

In prolonged vomiting

1. Tab. Thiamine 25-50 mg 3 times a day (if orally tolerated). If vomiting are not controlled with fluid and electrolytes replacement in 6 - 8 hours.
2. Inj. Metoclopramide 10 mg IV or 1M 8 hourly.
3. Inj. Ranitidine 50-100 mg 6 hourly.
4. If not controlled, Inj. Promethazine chloride 25-50 mg 1M or IV 8 hourly

Or

Inj. Chlorpromazine 25-50 mg 1M 4-6 hourly.

Once vomiting is controlled for 24 hours, oral intake is gradually started.

If well tolerated then only IV fluids are omitted. At first dry carbohydrate foods are given in the form of small meals at frequent intervals. Gradually full diet is introduced. In prolonged and severe disease, parenteral nutrition may be necessary. Give Tab. Metoclopramide 10 mg 3 times a day and Tab. Ranitidine 150 mg 2 times a day. If well tolerated for 48 hours, patient can be discharged from the hospital with dietary advice, reassurance and continue Tab. Metoclopramide for 5-7 days or longer depending on the response.

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BLEEDING IN FIRST TRIMESTER OF PREGNANCY (ABORTION)

Causes

- Pregnancy related - abortion (threatened/inevitable/ incomplete/missed)
- Ectopic pregnancy
- Molar pregnancy
- Local causes -trauma, erosion, polyp, infection, premalignant or malignant lesions.

Diagnosis by

- Clinical examination,
- Sonography
- Serum hcg levels as shown in table 15.5.
- Local lesions -per speculum examination.

Treatment

Abortion can be treated at a primary care level. Molar and ectopic pregnancy should be treated at a secondary/tertiary care level. Hospitalize all patients of bleeding in the first trimester.

Assess for blood loss and take immediate measures to combat hypovolaemia as indicated. Check BT, CT, CRT in missed abortion.

Table 15.5. Evaluation of patients presenting with bleeding in the first trimester of pregnancy

Diagnosis	Clinical findings	USG/hCG
Threatened abortion	Uterine size=period of gestation(POG) Internal Os closed	Consistent with live foetus
Inevitable abortion	Uterine size=POG Internal Os open, excessive bleeding and pain	Cardiac activity+Internal Os dilated
Incomplete abortion	History of passing products of conception (POC) Uterine size<POG Internal Os open/closed	Product Of Conception in uterine cavity
Missed abortion	Uterine size<POG Internal Os closed Brownish discharge+	Cardiac activity absent

Diagnosis	Clinical findings	USG/hCG
Molar pregnancy	History of passing vesicles ± Uterine size > or = or < than POG Internal Os open/closed	Honeycomb appearance β hCG levels very high
Ectopic pregnancy	Cervical excitation + Unilateral tender fornix, adnexal mass	Pseudogestational sac empty uterine cavity adenexal mass, hCG rise <66% in 48 hours

Surgical therapy

- Manul vacuum aspiration or suction evacuation, dilatation and evacuation or only evacuation in all cases of abortion and molar pregnancy except threatened abortion.
- Laparotomy/laparoscopic removal of ectopic pregnancy except a few selected cases of unruptured ectopic pregnancy (for details see respective section).

THREATENED ABORTION

Non Pharmacological

Bed Rest

Pharmacological

1. Inj. Pethidine 50 mg + Promethazine 25 mg 1M stat for those who have pain and are anxious. **Or**
Inj. Diazepam 10 mg 1M **Or**
Tab. Alprazolam 0.5 mg.
2. Tab. Folic acid 5 mg daily.
3. Monitor for the continuation of pregnancy after confirming cardiac activity by USG.
4. Discharge the patient 48 hours after bleeding stops.
5. Progesterone supplementation if serum progesterone <15 ng/ml only after confirming cardiac activity in cases of spontaneous conception.

References

1. Abortion. In: William's Obstetrics', Eds FG Cunningham, N F Gant, K J Leveno, L C Gilstrap III, JC Hoth, KD Wenstrom, 21st edition, Me Grawhill publication, International Edition, 2001, pp 855-882.
2. Haemorrhage in Early Pregnancy. In: Textbook of Obstetrics, 4th Edition, 1998, New Central Book Agency (P) Ltd., pp 170-215.

SEPTIC ABORTION

Any abortion associated with fever and signs of pelvic or generalized sepsis is considered septic abortion. Most septic abortions result from illegal abortions.

Clinical Features

- Fever, tachycardia
- Abdominal distension and tenderness

- Pelvic tenderness
- Purulent vaginal discharge
- Endotoxic shock and end organ failure.

Complications - injury to viscera like uterus and bowel, internal or external haemorrhage, peritonitis, disseminated intravascular coagulation, renal failure, hepatic failure, endotoxic shock and tetanus can occur.

Treatment (to be managed at a tertiary care level)

Before starting antibiotic therapy, high vaginal or cervical swab and blood culture should be obtained.

Pharmacological

1. IV fluids for correction of electrolyte imbalance (see section on shock in chapter 2).
2. Oxygen by facemask in severe cases. In cases of adult respiratory distress syndrome intubation and ventilatory support is required, and hydrotherapy if required.
3. If blood pressure is not controlled with fluid replacement, Inj. Dopamine infusion in 5% Dextrose 2 - 5 mg/kg/min and dose titrated according to clinical and haemodynamic response (for details see section on shock).
4. In case of shock, acidosis is corrected by IV Sodium bicarbonate 50-100 mEq in normal saline.
5. Inj. Ampicillin 2 g stat followed by 500 mg IV 6 hourly (after test dose).
Or
Inj. Cefuroxime or Ceftazidime 1-2 g IV 2 times a day (after test dose).
6. Inj. Gentamicin 1.5 mg/kg then 1 mg/kg IV 8 hourly.
Or
Inj. Amikacin 250 - 500 mg IV 8 hourly.
7. Inj. Metronidazole 500 mg IV 8 hourly.
Or
Inj. Clindamycin 600 mg IV 6 hourly.

Continue antibiotic therapy for 48-72 hours until culture sensitivity results provide an indication for changing the initial antibiotic regimens or patient does not respond to therapy. Monitor pulse, temperature, blood pressure, respiratory rate, urine output, and serum electrolytes. In severe cases CVP and ABG monitoring is required. Therapeutic goals are to maintain systolic BP >90 mm Hg, urine output > 30 ml/min, arterial P_{O2} >60 mmHg, and CVP 6 - 12 cm of H₂O.

8. (i) Uterine curettage: if patient's condition is stable, within 1 hour of antibiotic therapy, evacuation of the uterus by gentle curettage to remove infected products. If general condition is low at admission, curettage after 6-8 hours of antibiotic therapy and treat hypovolaemia.
- (ii) Laparotomy in case of injury to the uterus, suspected injury to the gut, presence of foreign body in the abdomen as evidenced by X ray or felt through the fornix, peritonitis.
Or
Colpotomy in cases of pelvic abscess.

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1. Abortion. In: William's Obstetrics Eds FG Cunningham, N F Gant, K J Leveno, L C Gilstrap III, JC Hoth, KD Wenstrom, 21st Edition, Mc Grawhill publication, International Edition, 2001. pp 855-882.
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3. The Abortion Problem. In: Postgraduate Obstetrics and Gynaecology. MK Krishna Menon, PK Devi, K Bhaskar Rao (eds), 1989, pp 89-105.

ECTOPIC PREGNANCY

Treatment of ectopic pregnancy should be undertaken at a secondary/tertiary care level set up. Laparoscopic surgery / laparotomy is done in all cases of ectopic pregnancy except in a few selected cases that are highly compliant and reliable and fulfill the following criteria:

- Unruptured ectopic pregnancy in haemodynamically stable patient.
- Gestational sac size <3.5 cm in greatest diameter.
- Serum hCG titer <10,000 mIU/ml.
- Gestation <6 weeks.
- Absence of foetal cardiac activity.

Treatment

Pharmacological (for unruptured ectopic pregnancy)

1. Obtain pretreatment hCG titers, haemogram, liver and renal function tests.
2. Inj. Methotrexate 50 mg/sq meter body surface area IM given on day 1.
3. Repeat hCG titers on day 4 and 7.
4. If day 7, hCG titers reflect a drop of at least 15% from maximum level then weekly hCG titers till negative.
5. If fall <15% or there is rise then repeat Inj. Methotrexate.

Reference

1. Ectopic Pregnancy In William's Obstetrics Eds FG Cunningham, N F Gant, K J Leveno, L C Gilstrap III, JC Hoth, KD Wenstrom, 21st Edition, Mc Grawhill publication, International Edition, 2001. pp 883-910.

MEDICAL TERMINATION OF PREGNANCY

The government of India has legalized medical termination of pregnancy up to 20 weeks of gestation by MTP Act 1971. Under this act, pregnancy can be terminated under following clauses:

Clauses and requirements

1. Damage to the life of the pregnant woman.
2. Grave injury to the physical or mental health of the pregnant woman.
3. Pregnancy caused by rape.
4. Substantial risk, that if the child was born, it would suffer from such physical or mental abnormalities as to be seriously handicapped.

5. Failure of any contraceptive method or device.

Necessary consent forms laid down in the Act should be duly filled and signed. Opinion of two registered medical practitioners is mandatory for second trimester MTP (>12 weeks).

First trimester MTP methods

Medical method.

It can be done upto 49 days amenorrhoea after proper counselling and excluding contraindications.

1. Oral Mifepristone 200-600 mg given on day 1.
2. On day 3 Misoprostol 400mg orally or 800 mg vaginally in hospital.
3. Woman generally aborts in next 4-8 hours and USG on day 14 to confirm complete abortion.
4. Asked to report if excessive bleeding anytime in between.

The procedure should be done only in centers approved under MTP Act.

Surgical method. Suction and evacuation done in all centers approved under MTP Act. Manual Vacuum Aspiration (MVA) can be done in all PHCs.

Second trimester MTP methods

To be conducted in secondary and tertiary care level. None of the second trimester methods are 100% safe and effective.

Most commonly extra amniotic ethacridine is combined with oxytocin or prostaglandins by various routes.

Better results if some method for cervical ripening is used 6 – 12 hours before.

If some method fails switch over to other method or surgical method.

Table 15.6. MTP methods for second trimester

Method	Drug	Mean induction abortion interval	Success rate	Side effects
Extra-amniotic instillation	0.1 % Ethacridine lactate 10 ml/week of gestation maximum 150ml with IV Oxytocin drip after 6-24 hours or	32-36 hours	75-80% 97%	
Intra-muscular	Mifepristone 200 mg followed after 36-48 hours by 400 mcg of oral, sublingual, or vaginal misoprostol every 3-6 hours up to 5 doses.	15-17 hours		Nausea, vomiting, diarrhoea, broncho- spasm

References

1. FOGSI Guidelines on MTP (FOGSI focus – Medical Abortion Sept. 5, 2011).

2. The Royal College of Obstetricians and Gynaecologists (RCOG) Revised Guidelines on Terminations of Pregnancy. 2011.

ANAEMIA IN PREGNANCY

Anaemia in pregnancy is defined as haemoglobin concentration of less than 11g/dl and haematocrit of less than 33%. It is further classified depending on Hb levels as mild 10-11 g%, moderate 7-10 g% and severe <7 g%.

Clinical Features

- Mild to moderate cases- weakness, exhaustion, lassitude, anorexia, glossitis, and stomatitis
- Severe cases present with palpitation, dyspnoea, oedema and cardiac failure.

Investigations

- Haemoglobin, haematocrit, total RBC counts.
- Peripheral smear for type of anaemia
- Haematological indices,
- Plasma proteins
- Stool for ova and cyst.

Treatment (iron deficiency anaemia)

All cases of severe anaemia to be admitted especially those with features of anoxia or cardiac failure.

Nonpharmacological

1. Diet rich in iron - jaggery, green leafy vegetable, sprouted pulses, meat, cooking food in iron utensils.
2. Diet rich in protein - pulses, lentils, milk and milk products, nuts.

Pharmacological

1. Oral iron therapy: Ferrous sulfate and Ferrous fumarate. Recommended dose is 200 mg elemental iron daily in divided doses. Not to be taken with meals, milk, coffee or tea. Continue therapy till blood picture returns to normal and then continue with 100 mg elemental iron for 3 months to build up the stores.

Government of India recommends minimum of 100 mg of elemental iron and 5 mg folic acid for 100 days starting at 20 weeks

2. Deworming to be done after first trimester, if necessary.
Tab. Mebendazole 100 mg 2 times a day for 3 days.

Or

Tab. Albendazole 400 mg single dose.

Monitoring of response to therapy

- Subjective improvement of feeling better, weight gain and improved appetite after 1-2 weeks.
- Reticulocyte response observed in 5-10 days (increases to 5-6%)
- Rise in Hb/haematocrit in 2-3 weeks at the rate of 0.1-0.25 g/dl/day or 0.8 -1 g/dl/week.

- If no improvement in 3 weeks reevaluate for: incorrect diagnosis, non-compliance, defective absorption, continuing loss, associated deficiencies.

Role of parenteral therapy is limited as rate of rise of haemoglobin with parenteral iron is similar to oral iron preparation.

Specific indications of Parenteral iron

- Severe intolerance to oral iron,
- Malabsorption,
- Noncompliance
- Moderate to severe anaemia in advanced pregnancy.

Total dose of iron to be given is calculated using following formulae:

% deficiency of Hb x weight in lbs x 0.03 + 300 mg.

Or

Simple method 250 mg of elemental iron needed for each gram of Hb deficit.

(Caution: Oral iron is suspended at least 24 hours prior to therapy to avoid reaction).

Inj. Iron dextran or Iron sorbitol complex (available as 50 mg/ml) 1M after an initial test dose of 0.5 ml intramuscularly, the injections are given daily or on alternate days in doses of 2 ml 1M using Z technique. To prevent staining of skin one can pass small amount of saline/air down the needle before withdrawing it.

(Caution: Emergency drugs to be kept ready for resuscitation in case of anaphylactic reaction).

Intravenous route is to be given as inpatient.

Total Dose Infusion (TDI) after test dose-

Inj. Iron Dextran is diluted in 5% dextrose. Initial infusion is given slowly at 8 drops per min. for half an hour to watch for reaction, and then increase gradually to 40 drops/min. Total iron dose is administered in a single sitting.

If >2000 mg then only half dose is given in one day.

IV without dilution to be administered over 20 minutes time slowly in fractional doses.

Monitor for adverse reactions like rigours, chest pain, and hypotension. If present stop the infusion.

Haemoglobin level	Institution	Management
<7 g/dl	District Hospital/Medical College Hospital	<p>Hb 5 – 7 g/dl</p> <p>Continue i/v sucrose OR if near term refer to higher center for blood transfusion.</p> <p>Repeat Hb after 4-8 weeks.If Hb is 9-11 then start IFA tablets.</p> <p>Hb 5g/dl or less</p> <p>Immediate admission regardless of gestational age in a facility with consultant and blood transfusion facility.</p>
7 – 9.9 g/dl	PHC, CHC, CH	2 IFA tablets (1 in morning & 1 in evening) daily for minimum of 100 days.

Haemoglobin level	Institution	Management
		<p>If gestational age > 20 weeks start i/v sucrose.</p> <p>Monthly Hb assessment</p> <p>After first trimester – Tab Albendazole 400 mg single dose.</p> <p>If despite IFA tablets Hb does not rise refer to a higher center.</p>
10-10.9 g/dl	Gram arogya Kendra/ SHC	<p>2 IFA tablets (1 in morning & 1 in evening) daily for minimum of 100 days.</p> <p>If gestational age > 30 weeks start i/v sucrose.</p> <p>Monthly Hb assessment.</p> <p>After first trimester – Tab Albendazole 400 mg single dose.</p> <p>If despite IFA tablets Hb does not rise refer to a higher center.</p>
≥ 11 g/dl	Gram arogya Kendra/ SHC	1 IFA tablets daily for 100 days.

Administration of i/v iron sucrose- based on total iron deficit

Total dose in mg = Body weight in Kg x (Target Hb – Actual Hb) x 2.4 + depot iron

This is followed by 10 mg/kg body weight to replenish the body stores, maximum 500mg.

- The infusion is administered as every 5 ml diluted exclusively in 100 ml of 0.9% NaCl . Diluted solution to be prepared just prior to the infusion. The rate should be of 100ml/30 minutes. Unused diluted solution should be discarded.
- **Maximum dose** – A maximum of 200 mg of elemental iron can be given in one dose (in 100 ml NS). This should be infused over 1 hour, can be given 1-3 times per week or on alternate days.
- Individual tolerance to high dose may vary. The lowest tolerable dose may be used.
- A total dose of 1 g can be given in 4-10 sittings(over a period of 1 month).
- Oral IFA tablets should be discontinued for 48 hrs before and after i/v sucrose administration.

Indications for blood transfusion

- Severe blood loss,
- Severe anaemia beyond 36 weeks of pregnancy
- Anaemia refractory to oral and parental therapy
- Anaemic patient with anoxia or cardiac failure.

Management of anaemic patients during labour

1. Propped up position, oxygen therapy.
2. Sedation and pain relief.

3. Digitalization may be required in cardiac failure due to severe anaemia.
4. Cut short 2nd stage by forceps.
5. Active management of 3rd stage of labour with Inj. Methylergometrine maleate 0.2 mg IV at the delivery of anterior shoulder. Inj. Methylergometrine to be avoided in patients of anaemia with cardiac failure.
6. Packed cell transfusion if necessary and if Hb <5 g after giving diuretics.

MEGALOBlastic ANAEMIA IN PREGNANCY

Occurs due to Vitamin B12 and/or Folic acid deficiency.

Clinical Features

- Asymptomatic.
- Vomiting, diarrhoea,
- Pallor,
- Hepatosplenomegaly
- Polyneuropathy.

Diagnosis: is by

- MCV>96fl, MCH >33 pg and MCHC normal.
- Peripheral smear - macrocytic anaemia with hypersegmentation of neutrophils, neutropenia and thrombocytopenia.

Treatment for folate deficiency

Tab. Folic acid 5 mg daily to be continued for at least 4 weeks in puerperium.

Treatment for Vitamin B12 deficiency

Inj. Cyanocobalamin 250 mcg IM every month.

Dimorphic anaemia

Both iron and folic acid in therapeutic doses.

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1. Haematological Disorders. In: William's Obstetrics, Eds Cunningham HG, Gant NF, Leveno KJ et al 21st Edition, 2001, McGraw Hill Company Inc., pp1307-1323.
2. Haematological Problems during Pregnancy. In: Practical Guide to High Risk Pregnancy and Delivery. Fernando Arias (ed), 2nd Edition, 1992, Harcourt Asia Pvt Ltd., pp 245-262.
3. Anaemia and Pulmonary Tuberculosis. In: Practical Obstetric Problems. Ian Donald (ed) 5th Edition, 1998, BI Publications, pp 198-226.
4. Medical and Surgical Illness Complicating Pregnancy. In: Textbook of Obstetrics, DC Dutta(ed), 4th Edition, 1998, New Central Book Agency (P) Ltd., pp 277-292.
5. Haematinics and Erythropoietin. In: Essential of Medical Pharmacology, KD Tripathi (ed), 4th Edition, 1999, Jaypee Brothers Medical Publisher Pvt Ltd., pp 580-595.

PRE-ECLAMPSIA

Pre-eclampsia occurs more frequently in primigravida. When superimposed with convulsions it is termed as eclampsia. Other high risk factors are - multiple pregnancy, hydramnios, and molar pregnancy.

Clinical Features

- Hypertension (BP > 140/90 mmHg recorded at 4-6 hours interval) with proteinuria and/or non-dependant oedema, developing after 20 weeks of gestation in a previously normotensive nonproteinuric patient.
- Pre-eclampsia is mild if diastolic BP < 100 mmHg, proteinuria trace to 1+ with minimal elevation of liver enzymes.
- Signs of severe pre-eclampsia are: SP > 160/110, 24 hour's urinary proteins > 2 g, elevated serum uric acid, thrombocytopenia (platelet count < 50,000/mm³), microangiopathic haemolysis, raised liver enzymes, has diastolic BP > 110 mmHg and foetal growth retardation.

Treatment

Hospitalize all cases. Definitive therapy is to terminate pregnancy. The choice is between immediate delivery and expectant management depends on:

1. Severity of disease.
2. Condition of mother and foetus and
3. Period of gestation (POG).

A. Mild pre-eclampsia

Expectant management: in cases of mild pre-eclampsia without foetal and maternal compromise, with gestational age < 37 weeks.

Nonpharmacological

Complete bed rest preferably in left lateral position and regular diet adequate in proteins and calories with omission of extra table salt.

Pharmacological

Anti-hypertensive treatment is started if there is persistent diastolic blood pressure over 100 mmHg. Aim of treatment is to achieve a systolic BP about 130 mmHg and diastolic BP around 90 mmHg.

Tab. Labetalol 100-200 mg 8 hourly (maximum 600 mg 6 hourly).

Or

Tab. Methyldopa 250 mg 8 hourly or 6 hourly (maximum dose 2 g/day).

Or

If BP is not controlled in 72 hours with the above, add any of the following:

Cap. Nifedipine 10 mg 8 hourly.

Or

Tab: Nifedipine retard 10 mg 12 hourly (maximum 30 mg 12 hourly).

Monitoring

- Daily monitoring of weight gain, BP, urine albumin, urine output.
- Weekly lab investigations - haemogram with platelet count, liver and kidney function tests specially serum uric acid, fundoscopy.

- Foetal monitoring by clinical and USG growth assessment, daily foetal movement count, non stress test twice weekly and biophysical score weekly,
- Doppler studies in IUGR.

Definitive management

Termination of pregnancy by labour induction/caesarean section in the following conditions:

- Gestational age 37 weeks,
- Foetal compromise like severe growth retardation,
- Oligohydramnios,
- Abnormal non-stress test or biophysical score,
- Maternal compromise like development of features of severe pre-eclampsia,
- Onset of labour,
- Rupture of membrane or bleeding.

B. Severe pre-eclampsia

Treatment is preferably done in a tertiary care center.

Nonpharmacological

- Observation in intensive care unit for 24 hours.
- Assessment of maternal and foetal conditions. BP monitoring 2-4 hourly, hourly urine output monitoring, watch for sign and symptoms of impending eclampsia and foetal distress.
- Lab Investigations: haemogram with platelet count, liver and kidney function tests, urinary proteins, coagulation profile, fundus examination, obstetric ultrasound with BPS.
- Intravenous fluids Ringer's lactate at rate of 60 ml/h (maximum 125 ml/h).

Pharmacological

The aim of the treatment is gradual lowering of blood pressure so that diastolic BP is maintained between 90-100 mmHg.

1. Immediate management.

1. Inj. Labetalol initial dose is 20 mg slow IV over 2 minutes followed by 20 to 40 mg at 10 minute intervals until BP is controlled or maximum dose 220 mg in 24 hours is reached.
2. Tab. Nifedipine 10 mg orally can be repeated after 30-60 min. (maximum dose 20 mg 4 hourly).

(**Caution:** Side effects- Tachycardia, headache, flushing, and aggravation of angina. Rapid fall in BP can cause foetal distress).

If BP is not controlled with oral treatment then IV drugs are started with intensive monitoring.

2. **Maintenance therapy.** After initial control of acute hypertension, patient is started on maintenance therapy with antihypertensives as described in management of mild pre-eclampsia.
3. **Prophylactic anticonvulsants** in women with severe pre-eclampsia especially in cases with signs and symptoms of impending eclampsia. Dose is same as for eclampsia.

Loading dose is Magnesium sulfate - 4g IV as 20% solution over 20 minutes and 10 g intramuscular as (50%) solution, 10 ml (5 g) in each buttock (total of 14 g) followed by second dose in alternate buttocks every 4 hours. Before each dose monitor for presence of patellar reflex, respiratory

rate >16/min and urine output >25 ml/h. It should be discontinued after 24 hours after BP is lowered if expectant management is planned.

After initial evaluation and stabilization of the patient further management is decided depending on foetal maturity and maternal response:

Expectant management. Considered if pregnancy is between 24-34 weeks and hypertension controlled with maximum of two drugs, urine output is normal, lab investigations are normal and no foetal compromise. Patient should be hospitalized till delivery. Managed as mentioned in the mild pre-eclampsia with antihypertensives, bed rest and more frequent maternal and foetal monitoring.

Definitive management is **termination of pregnancy**:

- Pregnancy beyond 34 weeks - stabilize maternal condition and terminate pregnancy.
- Pregnancy less than 24 weeks - stabilize maternal condition and terminate pregnancy.
- Patient on expectant management develops following features: uncontrolled hypertension despite maximum dose of 2 antihypertensive drugs, eclampsia, raised liver enzyme >2 times with right upper quadrant pain and tenderness, pulmonary oedema, platelet <1 lac/mm³, creatinine >1 mg/dl over baseline, persistent headache, vomiting and visual disturbance suggestive of impending eclampsia and foetal compromise.

After delivery, intensive monitoring should be continued for 72 hours with prophylactic anticonvulsant continued till 24 hours postpartum. Dose of antihypertensives should be gradually reduced.

ECLAMPSIA

Clinical Features

- Occurrence of generalized convulsions associated with signs of pre eclampsia during pregnancy, labour or within 7 days of delivery and not caused by epilepsy or other convulsive disorders.
- Eclampsia occurs antepartum in 46%, intrapartum in 16% and postpartum in 36% cases.
- Patient may develop acute left ventricular failure, cerebral haemorrhage, renal cortical necrosis, DIC, foetal distress, abruptio placentae, foetal death and even maternal death can occur.

Investigations

- Haemogram with platelet count,
- Liver and kidney function tests,
- Urinary proteins,
- Coagulation profile,
- Serum electrolytes,
- Fundus examination.

Treatment (To be managed at a tertiary care level)

Principles of management are control and prevention of recurrence of convulsion and control of hypertension. Treat any complication that arises and deliver safely as soon as possible. Continue anticonvulsant therapy 24 h after delivery or last fit whichever is latest.

Nonpharmacological

- Place the patient in left lateral position in a separate, quiet room.
- Secure and maintain airway.
- Use mouth gag or airway to prevent tongue biting/tongue falling back.
- Intubate if patient is deeply unconscious, poor arterial blood gases, extensive laryngeal oedema, and extreme restlessness.
- Suction to remove oropharyngeal secretions.
- Oxygen by face mask.
- Set up IV access.
- Monitor heart rate and respiration, BP, urine output.

Pharmacological

1. Inj. Magnesium sulphate loading dose of 14 g of which, 4 g as 20% solution given slow IV over 5 -10 minutes and 5 g as 50% solution given deep IM in each buttock (total 10 gram IM) .If fits are not controlled in 15min, give 2 g Magnesium sulfate as 20% solution slow IV.

Maintenance dose 5 g magnesium sulfate as 50% solution deep IM every 4 hours in alternate buttock Or Continuous IV regimen 4 g loading dose over 20 minutes followed by 1 g/h slow continuous IV infusion.

(Caution: Side effects are respiratory depression and neuromuscular depression in mothers. Neonatal respiratory and neuromuscular depression).

If respiratory depression occurs, give calcium gluconate 1 g IV as 10% sol. If respiratory arrest occurs, immediate endotracheal intubation and ventilation is to be done.

Monitoring: Check for respiratory rate to be more than 16/min, patellar reflex to be present and urine output >25 ml/h before giving magnesium sulfate.

Or

Inj. Phenytoin loading dose of 15-25 mg/kg slow IV not exceeding 25 mg/min diluted in normal saline for first 750 mg and then 12.5mg/min followed by 100 mg IV 8 hourly.

ECG tracing to be taken every minute for 10 min during infusion of first 750 mg.

2. Fluid management should be closely monitored to prevent complications such as pulmonary oedema, left ventricular failure and adult respiratory distress syndrome.
3. Anti hypertensives: as described in pre-eclampsia. Aim is to gradually lower the BP to 140-150/90-100mm Hg.

Definitive management is termination of pregnancy irrespective of the foetal maturity by labour induction and vaginal delivery/caesarean section.

Indications of caesarean section are:

- All deeply unconscious patients unless delivery is imminent,
- Uncooperative patient due to restlessness,
- If vaginal delivery is unlikely to occur within 6-8 hours from the onset of 1st eclamptic seizure or eclamptic seizures are not controlled in 6-8 hours,
- Other obstetric indications.

Care after delivery

- Patients of eclampsia and severe pre-eclampsia need intensive monitoring for at least initial 72 hours.
- Continue anticonvulsant till 24 hours after delivery or fit, whichever occurs later.
- Gradually decrease the dose of antihypertensives.
- Patient is discharged after 10-14 days of delivery or earlier if BP controlled without antihypertensives.
- Follow up after 6 weeks for reevaluation.

References

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3. Advances in Management of Severe Pre-eclampsia and Antihypertensive Therapy. In: Recent Advances in Obstetrics and Gynaecological. No. 20, John Bonnar (ed), 1998, Churchill Livingstone, pp 111-124.
4. Treatment of Severe Pre-eclampsia/Eclampsia Syndrome. In: Progress in Obstetric and Gynaecological, Studd (ed), 2000, Vol. 14, Churchill Livingstone, pp 102-119.
5. Practical guide to high risk pregnancy and delivery. Fernando Arias 2nd edition Pg 194-195.

PREGNANCY WITH HEART DISEASE

Organic heart disease in pregnancy is commonly due to rheumatic heart disease or congenital heart disease.

Clinical Features

- Severe or progressive dyspnoea, progressive orthopnoea, paroxysmal nocturnal dyspnoea, haemoptysis,
- Syncope with exertion
- Chest pain related to effort or emotions.

Diagnosis - Echocardiography is diagnostic.

Treatment (managed at a tertiary level center)

Much of the clinical approach to the pregnant women with heart disease is according to NYHA class irrespective of the aetiology of the heart disease.

Nonpharmacological

- NYHA class III and IV patients are to be hospitalized throughout the pregnancy while class I and II can be managed as outdoor patients with more frequent antenatal visits and admission at 38 weeks.
- Rest for 10 hours each night and 1 to 2 hour after each meal.
- Lighthouse work and walking without climbing stairs is permitted. No heavy work is allowed.
- Avoid high salt intake.

- Screen and treat at the earliest for excessive weight gain, abnormal fluid retention, anaemia, pregnancy induced hypertension, infections.

Pharmacological (in consultation with the cardiologist)

(for details see section on CHF in chapter 3)

In case of rheumatic heart disease,

1. Inj. Benzathine penicillin 1.2 mega units IM 3 weekly.
2. Treat any infections with appropriate antibiotics.
3. In patients with mechanical prosthetic valves.

Inj. Heparin throughout pregnancy to maintain PTT at 1.5 to 2.5 times the normal control.

(Caution: Oral anticoagulants are not safe during pregnancy because of risk of congenital anomalies in the foetus. But if required, can be given after first trimester and continued till 4 weeks before delivery. However, oral anticoagulants are safe during lactation).

Labour management

1. Caesarean is performed for only obstetrical indications.
2. Pain relief is important during labour. Best option is to give continuous epidural analgesia. It is contraindicated in women with intra cardiac shunts, aortic stenosis, pulmonary hypertension, and hypertrophic cardiomyopathy. Inj. Morphine can also be given for pain relief.
3. Fluids should be restricted to 75 ml/min. Bolus Oxytocin and Methylergometrine should be avoided.
4. Antimicrobial prophylaxis for infective endocarditis required in all patients with cardiac lesions undergoing any operative procedure or in labour.

Inj. Ampicillin 2 g + Inj. Gentamicin 1.5 mg/kg (maximum 120 mg) IV or IM 30 min before procedure followed by Cap. Ampicillin 1 g IM or IV; or Cap. Amoxycillin 1 g orally 6 hours after initial dose.

If patient is allergic to penicillin Inj. Vancomycin 1 g IV (over 1-2 hours) plus Inj. Gentamicin 1.5 g/kg (maximum 120 mg). Infusion to be completed within 30 min before procedure.

References

1. Cardiovascular Disease. In: William's Obstetrics. FG Cunningham, N F Gant, K J Leveno, L C Gilstrap III, JC Hoth, KD Wenstrom (eds), 21st Edition, McGraw-Hill publication, International Edition, 2001. pp 1181-1208.
2. Heart Disease in Pregnancy. In: Medical Disorders in Obstetric Practice. Michael de Swiet (ed), 4th Edition, Blackwell Publishing, 2002, pp 125-158.

DIABETES IN PREGNANCY

Pregnancy can be complicated by pre-existing insulin dependent or noninsulin-dependent diabetes or gestational diabetes. Gestational diabetes is defined as the carbohydrate intolerance of variable severity with onset or first recognition during pregnancy.

Treatment

(managed at a tertiary care center)

Nonpharmacological

- **Dietary advice.** Total daily calorie intake should be 30 KCal/kg current pregnancy body weight if her current weight is 80-120% of ideal pre-pregnancy weight. In case current weight is <80% or >120% of ideal pre-pregnancy weight, then calorie intake is 36-40 Kcal/kg current pregnancy weight or 24 Kcal/kg current pregnancy weight respectively. Total daily calorie intake should be 30-35 KCal/kg current pregnancy weight. Complex carbohydrates should provide about 50% of the total calories, which should be well distributed throughout the day. High fiber diet is beneficial with 30-50 g fibers daily. Total diet should be distributed in 3 major meals and 3 mid meal snacks.
- **Ultrasound assessment** of foetal gestational age is to be done as early as possible. Foetal congenital anomalies should be ruled out by Level II USG scan at 16 - 18 weeks, foetal echo at 22 weeks. Serial USG for foetal growth monitoring and biophysical scoring for assessment of foetal well being after 32 weeks of gestation.

Pharmacological

A. Antenatal management. Initial evaluation should include blood sugar, KFT and fundoscopy.

- (a) **Pre-existing diabetes.** Oral hypoglycaemic agents are contraindicated during pregnancy. If patient is on oral hypoglycaemics, switch over to insulin therapy as soon as pregnancy is diagnosed. .
 1. Inj Insulin: 0.6-0.8 U/kg in 1st trimester, 0.7 - 0.9 U/kg in 2nd trimester and 0.8 - 1.2 U/kg in 3rd trimester.

Usually a combination of intermediate acting and regular insulin in proportion of 2: 1 is given. 2/3 of the total requirement is given in the morning before breakfast and 1/3 is given at night with regular insulin before dinner and intermediate at bedtime. Dose adjustment is done to maintain blood sugar level between fasting <95 mg% and postprandial between 70 and 120 mg%.

Sampling of blood should be done initially fasting, pre and post breakfast, pre and post lunch, pre and post dinner and 2 AM regularly till controlled and then daily monitoring by fasting and postmeal sugars.

2. Hospitalization is required in cases of excessive vomiting, infections, maternal complications like hypertension, retinopathy, nephropathy, foetal compromise like macrosomia or intra uterine growth retardation (IUGR) or poor diabetic control.

(b) Gestational diabetes.

1. General management is same as outlined above.
2. Diet control. Patient is reassessed after 1 week. If control not achieved insulin therapy is started. Confirmation of blood sugar and regular insulin if required may be given before breakfast, before lunch and before dinner or combination of regular and long acting can be given before breakfast and dinner. Hypoglycaemia should be avoided.
3. If fasting plasma sugar is >105 mg% insulin is usually required for control.

Regular insulin is adjusted to normalize post breakfast glucose and intermediate for post lunch glucose control. If evening or fasting glucose is elevated, 2nd daily injection is added. If both are elevated, mixture of intermediate and regular insulin before dinner is added. If only fasting is elevated, add intermediate acting insulin at bedtime.

Or

Inj. Regular Insulin 3 times a day before each main meal which can be combined with one dose of intermediate acting insulin at bed time in case there is fasting hyperglycaemia.

Apart from routine antenatal monitoring, blood sugar monitoring is required throughout pregnancy. Therapeutic goal is to achieve plasma blood sugar levels fasting <95 mg% and 2 hour postprandial <120 mg%. When levels are high daily monitoring with insulin dose adjustment is required. Once control is achieved, patient can be managed at home with weekly bloodsugar profile.

4. Glycosylated Hb (HbA1c) to be done in 1st trimester. Value of 9% or above indicates poor glycaemic control, carries higher risk of congenital malformation; MTP may be offered after proper evaluation.

B. Management during labour

In uncomplicated case with good glycaemic control pregnancy can be continued till expected date of delivery. In presence of complications or foetal compromise pregnancy is terminated at 38 weeks or earlier if required. If estimated foetal weight is >4 kg, caesarean section is performed. Labour is managed with intensive monitoring. Blood sugars are monitored 3-4 hourly aim is to keep blood sugars between 100-120 mg%, using the sliding scale method using regular insulin. In the postpartum period, the requirement of insulin is decreased.

(For other details see section on diabetes in chapter 11)

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1. Diabetes. In: William's Obstetrics. FG Cunningham, N F Gant, K J Leveno, L C Gilstrap III, JC Hoth, KD Wenstrom (eds), 21st Edition, Me Grawhill Publication, International Edition, 2001. pp 1359-1382.
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PRETERM LABOUR

Onset of labour pains in pregnant women after 20 weeks and before 37 weeks of gestation associated with progressive dilatation and effacement of the cervix is known as preterm labour.

Risk factors include:

- Low socioeconomic status;
- Heavy manual labour,
- Extremes of age (<20 years and >40 years),
- Previous history of abortion or preterm delivery,
- Cervical or vaginal infection,
- Multiple gestation or overdistended uterus,
- Hypoxic conditions like anaemia, heart disease,
- Preeclampsia,
- IUGR, foetal congenital malformations
- Antepartum haemorrhage in present pregnancy.

Investigations:

- Haemogram,

- Urine culture,
- Endocervical swab for culture and sensitivity.

Clinical Features

Uterine contraction of duration of 30 sec or more at interval of 10 minutes or less accompanied by cervical dilatation and effacement with or without leaking or bleeding per vaginum.

Treatment

Nonpharmacological

Hospitalization with complete bed rest, preferably in a centre with neonatal intensive care unit.

Pharmacological

1. Inj. Pethidine 50mg + Inj. Promethazine 25 mg IM stat and can be repeated 8 hourly.
2. Immediate tocolysis in pregnancies <35 weeks,

If membranes are intact and labour is not advanced (cervical dilatation <4 cm), there is no indication for immediate delivery and no contraindication for tocolysis.

Inj. Isoxsuprine HCl 10 mg IM (drug of choice) every 6 hours in case of mild contraction;

Intravenous infusion if strong contractions are established 0.2-0.4 mcg/min in 5% dextrose. Maximum dose is 0.8 mcg/min to be continued at least 2 hours after the contractions cease. Followed by IM therapy for 24 hours.

(**Caution:** Side effects tachycardia and hypotension, hypokalaemia, neonatal tachycardia, hypotension and rarely pulmonary oedema and acute respiratory distress syndrome).

Or

Inj. Ritodrine infusion 3 ampoules (150 mg) in 500 ml of 5% dextrose or ringer lactate at 50- 100 mcg/min (5-6 drops/min), increase by 50 mcg every 10 min till contractions cease or side effects appear (maximum dose 350 mcg/min), continue for 12 hour after contractions stop. This is followed by oral treatment - 10 mg every 2 hours for 24 hours then 10-20 mg every 4-6 hours.

(**Caution:** Contraindications: Poorly controlled diabetes or thyroid disease, sickle cell disease).

Or

Inj. Magnesium sulfate 4-6 g as 20% solution bolus over 30 minutes followed by infusion of 4-6 g/h.

(**Caution:** Contraindicated in patients with myasthenia gravis, cardiac decompensation. Use with caution in renal disease. It can cause flushing, lethargy, headache, muscle weakness, dryness of mouth, nausea and foetal distress, transient non-reactive non-stress test (NST).

Or

Cap. Nifedipine 30 mg loading dose followed by 10-20 mg every 4-6 hours.

(**Caution:** Do not administer along with magnesium sulfate; contraindicated in maternal hypotension < 90/50 mmHg), cardiac disease. Use with caution in renal disease. Maternal side effects include flushing, headache, nausea, dizziness, hypotension). Monitor pulse, BP, and cessation of the uterine contractions. If pulse rate >120/min and BP <90/50 mmHg stop tocolysis. Monitoring in magnesium sulfate therapy is as outlined in eclampsia. Monitor for onset of chorioamnionitis (fever, tachycardia with uterine tenderness).

Maintenance therapy.

1. Tab. Isoxsuprine orally 10 mg 6 hourly or 20 mg 12 hourly (maximum daily dose is 40 to 80 mg/day) to be continued till 34 weeks of pregnancy (long term therapy is controversial).

2. In pregnancies at 28 - 34 weeks of maturity, steroids are given for foetal lung maturity.
Inj. Betamethasone 12 mg IM 2 doses 24 hours apart.

Or

Inj. Dexamethasone 6 mg IM four doses 12 hours apart or 12 mg IM two doses 12 hours apart.

(Caution: Contraindicated if clinical or laboratory evidence of chorioamnionitis is present).

3. Cap. Ampicillin 500 mg or Erythromycin 500 mg 4 times a day for 5-7 days, only if PROM is present.

Patient may be discharged after 1 week of toco lysis followed by regular antenatal surveillance.

Delivery

In cases of ineffective tocolysis or with contraindications for tocolysis, labour is allowed to progress and mode of delivery is decided as per obstetric indications. Careful foetal monitoring required throughout labour. If any sign of hypoxia, caesarean section is better but foetus should have a fairly good chance of survival depending on neonatal care facility.

References

1. Clinical Problems of Preterm Labour. In: Clinical Obstetrics and Gynaecology, 2000, 43, pp713-818: .
2. Preterm Birth. Diabetes. In: William's Obstetrics. FG Cunningham, N F Gant, K J Leveno, L CGilstrap III, JC Hoth, KD Wenstrom (eds), 2 J st Edition, Me Grawhill Publication, InternationalEdition, 2001. pp 689-728.
3. Preterm Labour. In: Practical Guide to High Risk Pregnancy and Delivery, Fernando Arias (ed)2nd Edition, 1998, Mosby, pp 71-100.
4. Recent Advances in Preterm Labour. In: Recent Advances in Obstetrics and Gynaecology, No20, H John Bonnar (ed), Churchill Livingstone, pp 97-110.

ANTEPARTUM HAEMORRHAGE

Antepartum haemorrhage is defined as bleeding from genital tract after 20 weeks of pregnancy and before completion of second stage of labour.

Clinical Features

Clinical presentation varies depending on the severity of blood loss (Table 15.7) and cause of bleeding (Table 15.8). In mild haemorrhage there may be no maternal or foetal compromise, while massive haemorrhage can lead to hypovolaemic shock, coagulation failure, renal failure, foetal distress and may result in maternal and foetal death.

Diagnosis –

Ultrasound is confirmatory for placenta praevia

Table 15.7. Clinical presentation and severity of bloodloss

Acute blood loss	Clinical findings
1000 ml	None
1000-1500 ml	Orthostatic blood pressure changes, positive tilt test, Pulse Pressure = 30 mmHg, reduced peripheral perfusion, prolonged capillary refill time
1500-2000 ml	Cold clammy skin, tachycardia, tachypnoea, hypotension
> 2000 ml	Profound shock, non-palpable pulse, intrauterine death of the foetus

Table 15.8. Causes of bleeding

- Placenta previa
- Abruptio placentae
- Unclassified bleeding
- Associated conditions—cervical erosion, malignancy

Placenta praevia	Abruptio placentae
Pallor usually proportionate to blood loss	Pallor may be disproportionate to apparent blood loss
Painless recurrent bleeding	Associated pain in abdomen
Relaxed non-tender uterus	Tense tender uterus
Free-floating presenting part	Foetal parts not easily palpable
Abnormal lie	Foetal heart irregular or absent
	Pregnancy induced hypertension

Treatment

All patients of APH should be hospitalized in a well equipped center with facilities for blood transfusion, emergency caesarean section and neonatal care unit.

A. Massive haemorrhage

Following resuscitative measures are started immediately in massive haemorrhage. Simultaneously prepare the patient for termination of pregnancy by vaginal/caesarean section depending on the cause of bleeding.

Nonpharmacological

1. Establish intravenous line (one or two 14/16 gauge cannula)
 - a. Draw 20 ml blood for cross-match, haemogram, coagulation profile.
 - b. Start fluid therapy rapidly as described below.
2. Head down tilt, keep the patient warm.
3. Oxygen by mask at 8 liters/minute.
4. Empty bladder (Foley's catheter for urine output).

Pharmacological

1. IV fluids and blood replacement therapy (for details see section on shock in chapter 2).
2. Definitive treatment is termination of pregnancy by caesarean section in cases of placenta praevia and by vaginal/caesarian section in cases of abruptio placentae.

B. Mild APH

Expectant management

In a case of placenta praevia without maternal and foetal compromise, expectant management is planned if pregnancy is less than 37 weeks and patient is not having active bleeding and labour pains.

1. Hospitalize and bed rest with foetal and maternal monitoring.
2. Inj. Dexamethasone 12 mg IM 12 hourly for 2 doses should be given for foetal lung maturity if POG <35 weeks.
3. Definitive treatment is termination of pregnancy in case of following occurrence of life-threatening bleeding, pregnancy >37 weeks, patient is in labour, in all cases of abruptio placentae, baby is dead, congenitally malformed baby and bleeding recurring or premature rupture of membranes on expectant management leading to maternal or foetal compromise.
 - a. **Indications for caesarean section** are:
 - Major degree placenta praevia,
 - Non vertex presentation,
 - In case of abruptio placentae with live foetus
 - If cervix is unfavourable (labour is likely to be longer than 6 hours),
 - Failure to progress after amniotomy and oxytocin infusion and other
 - Obstetrical indications for caesarean section.
 - b. **Indications for vaginal delivery** in APH are:
 - Minor degree placenta praevia with vertex presentation and slight bleeding with favourable cervix and
 - Abruptio placentae with mild bleeding and no increased uterine tone,
 - Foetus is dead or has major congenital malformation incompatible with life.

For induction artificial rupture of membranes followed by oxytocin infusion is done. Oxytocin infusion is continued in the postpartum period to prevent postpartum haemorrhage. In abruptio placentae monitoring is done to detect maternal complication early (pulse, BP, uterine height girth chart, vaginal bleeding, urinary output, BT, CT, clot retraction time).

References

1. Antepartum Haemorrhage. In: Anesthetic and Obstetric Management of High Risk Pregnancy, Datta S (ed), 2nd Edition, 1996, Mosby.
2. Obstetric Haemorrhage. In: Intrapartum Obstetrics, Reptke JP (ed), 1996, Churchill Livingstone, pp 203-222.
3. Obstetric Haemorrhage. In: William's Obstetrics. FG Cunningham, N F Gant, K J Leveno, L C Gilstrap HL, JC Hoth, KD Wenstrom (eds), 21st Edition, Me Grawhill Publication, International Edition, 2001. pp 619-670.

POSTPARTUM HAEMORRHAGE (PPH)

Postpartum haemorrhage is excessive blood loss from the genital tract after delivery of the foetus exceeding 500 ml or affecting the general condition of the mother.

Clinical Features

Primary PPH i.e. bleeding within 24 hours of delivery is commonly due to

- Atonic uterus (90% cases)
- Cervical/vaginal tears (traumatic pph)
- Occult uterine inversion,
- Rupture uterus
- Coagulation defect.

Secondary PPH -Abnormal bleeding can also occur between 24 hours and 6 weeks of delivery due to

- Sepsis,
- Retained placental bits,
- Placental polyp,
- Choriocarcinoma.

PPH requires prompt and effective management, failing which it may result in complications like hypovolaemic shock, coagulation failure, renal failure, hepatic failure, adult respiratory distress syndrome and may also result in maternal death.

Monitor pulse rate, blood pressure, respiratory rate and urine output.

Treatment

Pharmacological

Same as in APH (for details see section on shock in Chapter 2).

Atonic PPH

Prevention

Identify risk factors and anticipate the problem.

Active management (oxytocin 5 units intramuscularly at the birth of anterior shoulder or after delivery of placenta) should be done in all cases unless contraindicated.

Nonpharmacological

Placental removal with cord traction if already separated uterine massage and bimanual compression.

Pharmacological

1. Oxytocin Infusion (10-40 units in 500 ml Ringer's Lactate/Normal Saline at 125 ml/min).
2. Methyl ergometrine maleate 0.2 mg IV may be repeated 1M after 5-10 min.
- (**Caution:** Contraindicated in heart disease, hypertension).
3. If bleeding is not controlled 15-MethylPGF₂α 0.25 mg IM/intramyometrial, may be repeated every 15-90 min up to a maximum of 2 mg.

(**Caution:** Contraindicated in bronchial asthma, epilepsy).

4. In patients with bronchial asthma and epilepsy, administer with caution Tab. Misoprostol 600 mcg per rectum.

Indication for referral

If patient is still bleeding despite medical therapy and if facilities for transfusion and further management are not available, arrange for transfer to a higher center. Intrauterine packing may be done in the mean time.

Surgical treatment (Table 15.9)

Cause of PPH	Management
Retained placenta	Manual removal of placenta under general anaesthesia Exploration and repair
Cervical/vaginal tears Rupture uterus	Laparotomy with repair/ hysterectomy
Uterine inversion	Reposition under GA
Atonic PPH not controlled	Laparotomy with uterine artery ligation with medical measures Internal artery ligation/Hysterectomy

Table 15.9. Surgical treatment of PPH

References

2. Postpartum Haemorrhage. In: American College of Obstetricians and Gynaecologists, ACOG Technical Bulletin no. 243. Washington, DC, 1998.
2. The Management of Postpartum Haemorrhage. In: Scottish Obstetrics Guidelines and Audit Project, 1998.
3. Obstetrical Haemorrhage In: William's Obstetrics. FG Cunningham, N F Gant, K J Leveno, L C Gilstrap III, Je Hoth, KD Wenstrom (eds), 21st Edition, Mc Grawhill Publication, International Edition, 2001, pp 619-670

VAGINAL DISCHARGE

It is discussed in section on Sexually Transmitted Diseases in Chapter 14.

PELVIC INFLAMMATORY DISEASE (PID)

PID is a spectrum of infections involving female upper genital tract i.e. cervix, uterus, tubes, ovaries and pelvic peritoneum.

Causes

- Sexually transmitted diseases
- Post abortal and puerperal sepsis,
- Operative procedures like dilatation and curettage, endometrial biopsy, insertion of intrauterine device.

Clinical Features

- Lower abdominal pain, cervical motion tenderness and adnexal tenderness, fever, cervical discharge and leucocytosis.
- In severe cases patient may be toxic with high-grade fever, vomiting, dehydration, and abdominal distension.

- Long term sequelae can be infertility, ectopic pregnancy, chronic pelvic pain and even mortality can occur in case of ruptured tube-ovarian abscess.
- Failure of acute PID to resolve completely results in chronic PID with features of severe, persistent and progressive pelvic pain, repeated acute exacerbation of PID, tubo-ovarian inflammatory mass, dyspareunia or bilateral ureteral obstruction from ligamentous cellulitis.

Treatment (Acute PID)

I. Outpatient treatment

Patient of mild PID with slight pain and tenderness, without toxic features like high-grade fever, vomiting, and abdominal distension can be managed as outpatients with the following drug regimens: Either of the following two regimens can be given:

Regimen A

1. Inj. Cefoxitin 2 g IM, plus Probenecid 1 g orally, as a single dose.

Or

Inj. Ceftriaxone 250 mg IM as a single dose.

Or

Inj. Ceftizoxime or Cefotaxime 500 mg IM as a single dose.

2. Cap. Doxycycline 100 mg 2 times a day for 14 days.

Regimen B

1. Tab. Ofloxacin 400 mg oral 2 times a day for 4 days.

2. Tab. Clindamycin 450 mg oral 4 times a day for 14 days.

Or

Tab. Metronidazole 500 mg 2 times a day for 14 days.

Follow up after 2 - 3 days of initiation of therapy; patient is reevaluated for clinical response. If poor response, patient is to be admitted for intravenous antibiotics.

II. Indoor treatment

If diagnosis is uncertain and surgical emergencies such as appendicitis and ectopic pregnancy cannot be ruled out, patient is pregnant, post-abortion or puerperal and if the patient is adolescent (among adolescents, compliance with therapy is unpredictable), severe illness or nausea and vomiting, HIV positive, unable to follow or tolerate an out patient regimen and outpatient therapy failed.

- Bed rest.
- Hydrotherapy, if febrile.
- IV fluids in cases of vomiting and dehydration and correction of electrolyte imbalance.
- Investigate and obtain haemogram with ESR, LFT, KFT, serum electrolytes, blood culture, endocervical swab culture, ultrasonography if adnexal mass.
- Monitoring by clinical condition, vital monitoring, signs and symptoms of pelvic abscess and peritonitis.

Either of the following regimens may be instituted at the earliest without waiting for culture reports:

Regimen A

- I. Inj. Cefoxitin 2 g IV every 6 hours.

Or

- Inj. Cefotetan 2 g IV every 12 hours.
2. Inj. Doxycycline 100 mg IV or orally every 12 hours.
3. Inj. Metronidazole 500 mg IV 8 hourly.

Regimen B

1. Inj. Clindamycin 900 mg IV every 8 hours.
2. Inj. Gentamicin 2 mg/kg IV followed by 1.5 mg/kg every 8 hours.
3. Inj. Diclofenac sodium 75 mg deep IM 8 hourly.

Or

- Inj. Paracetamol 500 mg 1M SOS.
4. Inj. Metronidazole 500 mg IV 8 hourly.

Injectable regimen should be continued for at least 48 hours after the patient demonstrates clinical improvement (becomes afebrile, decrease in lower abdomen and pelvic tenderness, improvement in constitutional symptoms).

After this, Doxycycline 100 mg 2 times a day orally or Clindamycin 450mg oral 4 times a day should be continued for total of 14 days.

Clinical improvement should occur within 3 days of initiation of therapy. Consider further diagnostic tests/laparoscopy if symptoms do not improve or worsen.

Different procedures may be required in the following situations:

- Colpotomy for drainage of midline pelvic abscess
- Dilatation and evacuation of septic products of conception in post abortal sepsis.
- Laparotomy in cases of pyoperitoneum, resistant peritonitis, intestinal obstruction, ruptured tubo-ovarian abscess, enlarging pelvic mass despite medical therapy,
- Laparoscopy: if diagnosis is uncertain, in cases of no response to treatment, to reconfirm the diagnosis, obtain cultures from cul de sac and fallopian tubes and drain pus if necessary.

Treatment of the sexual male partner

Asymptomatic male partner:

Inj. Ceftriaxone 125 mg 1M followed by oral Doxycycline 200 mg 2 times a day for 14 days.

Treatment (Chronic PID)

Chronic PID can also be caused by pelvic tuberculosis. Treatment of chronic PID is surgical. Type of surgery is decided considering pathological lesion, patient's age, and desire for child bearing. Definitive surgery is total abdominal hysterectomy with bilateral salpingo-oophorectomy, but in young females conservative surgery is preferred. Injection placentex (Extract of fresh human placenta) and pelvic diathermy may help.

Treatment (Pelvic tuberculosis)

Primary treatment is medical therapy with anti tubercular drugs for 6 months.

Daily dose of the drugs is:

1. Tab. Isoniazid 5 mg/kg (maximum 300 mg).
2. Cap. Rifampicin 10mg/kg (maximum 600 mg).
3. Tab. Pyrazinamide 15-30mg/kg (maximum 2 g).

4. Cap. Ethambutol 15-25mg/kg (maximum 2.5 g).

(for details see section on tuberculosis in Chapter 1).

All these 4 drugs are given in the initial phase for 2 months followed by INH and rifampicin for 4 months. Indications of surgery are: primary unresponsiveness, persistence or enlargement of adenexal mass after 4 - 6 months of treatment, persistence or recurrence of pelvic pain on treatment. Definitive surgery is total abdominal hysterectomy with bilateral salpingo-oophorectomy.

References

1. Guidelines for Treatment of Sexually Transmitted Diseases. Centers for Disease Control and Prevention. In: MMWR Morb Mortal Weekly Rep 1998 Jan 23; 47(RR-1): 1-111.
2. Pelvic Inflammatory Disease. In: Te Linde's Operative Gynaecology, John A Rock, John D Thompson (eds), 1997, pp 657-686.

PREMENSTRUAL SYNDROME (PMS)

It is a cyclic recurrence of physical, psychological or behavioural symptoms that appear after ovulation and resolve after the onset of menstruation. PMS requires treatment when the symptoms are severe enough to interfere with the woman's lifestyle, relationships and occupational functioning.

Clinical Features

- Common somatic symptoms - feeling of bloating, body aches, breast tenderness, headache, food cravings and poor concentration.
- Emotional - emotional hypersensitivity, depression, irritability, mood swings, anxiety, tension, fear of loss of control and confusion.

Diagnosis is confirmed by excluding the concomitant medical or psychiatric disorders with which it may be confused (depending on the symptoms).

Treatment

Nonpharmacological

Life-style advice should be offered to all women as first line of treatment.

1. Daily charting of symptoms for two months.
2. Dietary modifications like: increase complex carbohydrate meals, reduce or eliminate, especially in the luteal phase - salts, chocolate, caffeine and alcohol; and several small meals per day.
3. Moderate regular aerobic exercise like brisk walk 1-2 miles per day for 4-5 days/week.
4. Stress management courses/counselling.

Pharmacological

1. Tab. Pyridoxine 100 mg/day for 10-14 days (during luteal phase) (maximum daily dose is 150 mg).
Or
Tab. Evening primrose oil 500 mg 3 times a day.
2. In case of headache or premenstrual dysmenorrhoea, Non steroidal anti-inflammatory drugs - like mefenamic acid 500 mg 3 times a day for duration of symptoms till onset of menstruation.
3. In case of predominantly physical symptoms (bloating, irritability, swelling, weight gain, breast tenderness),

Tab. Spironolactone 100 mg/day for

Or

Tab. Bromocriptine 1.25 - 5 mg/day in the luteal phase for mastalgia.

Common side effects are nausea and vomiting. Tablet can be given vaginally if side effects are very severe.

If no relief in symptoms with above measures in 2 - 3 cycles and symptoms are predominantly emotional, then the following drugs are used preferably in consultation with a psychiatrist:

Tab. Fluoxetine 5-20 mg/day

In non-responders to the above therapy, ovulation suppression may be beneficial; any of the following can be used:

Low dose combined oral contraceptive pills, 1 pill daily from 5th to 25th day of the cycle.

Or

Progestins: Medroxyprogesterone acetate (MPA) 15 - 30 mg/day (10 mg 3 times a day) or Depot MPA 150 mg IM 3 monthly: Irregular bleeding is very common.

Or

Tab. Danazol 200-800 mg/day. Side effects like weight gain, facial hair, acne are the usual limiting factors.

Treatment may be stopped after 3 - 6 cycles and look for return of the symptoms. If symptoms return treatment is required till menopause. If no response to the above treatment refer to a higher centre.

References

1. Clinician's Approach to the Diagnosis and Management of Premenstrual Syndrome. In: Clinical Obstet Gynaecology, 1992, pp 637-657.
2. Hormonal Manipulations in the Treatment of Premenstrual Syndrome. In: Clinical Obstet Gynaecology, 1992, pp 658-666.
3. Premenstrual Therapy. In: Clinical Obstet Gynaecology, 1998, pp 405-421.
4. Premenstrual Syndrome. In: Gynaecology, Robert Shaw, W Patrik Soutter, Stuart L Stanton (eds), 2003, pp 401-414.

DYSFUNCTIONAL UTERINE BLEEDING (DUB)

It is abnormal uterine bleeding in the absence of organic disease of the genital tract.

Clinical Features

Disturbances of the menstrual cycle, regular and irregular uterine bleeding and alteration in the amount or duration of the menstrual blood loss.

Commonly due to anovulatory cycles but can occur in the ovulatory cycles also. Anovulatory cycles are usual in postmenarche and premenopausal age groups and are usually irregular, variable in duration and amount of bleeding.

Treatment (Acute bleeding - first episode)

A. **Severe bleeding (haemodynamically unstable patient)**

1. Usual steps taken for any serious haemorrhage should be instituted immediately like IV line, fluid replacement, blood transfusion, oxygen inhalation and monitoring of vitals.

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2. Dilatation and Curettage is the quickest way to arrest bleeding except in cases of puberty menorrhagia where medical management is preferred. IV Tranexamic acid can be tried before resorting to surgical intervention.

B. Less severe bleeding (haemodynamically stable patient)

High dose Progestogen: Norethisterone 10mg 3 times a day until bleeding stops (not >3 days) followed by Norethisterone 5-10 mg.

Or

Medroxyprogesterone acetate 10 mg per day for 21 days. Withdrawal bleeding occurs after 2-4 days of stopping the drug and stops in 4-5 days.

Or

Combined oral contraceptive pills (OCs) containing 50 mcg ethinyl oestradiol 1 pill 2 times a day for 7 - 10 days followed by progestins for 7-10 days, followed by withdrawal bleeding.

C. If bleeding is not controlled with progestogens

Patient is having heavy bleeding for many days, endometrial curettage yields minimal tissue, or when the patient has been on progestogen medication (OC's or Depot MPA) and the endometrium is shallow and atrophic.

Treatment schedules of high dose oestrogens, depending on the severity of the bleeding the following can be used:

1. Conjugated oestrogen 25 mg IV every 4 h till bleeding abates or for 12 h. Progestin treatment is started at the same time.
2. Oral treatment conjugated oestrogen 1.25 mg or 2 mg oestradiol valerate given orally every 4 h for maximum of 24 h followed by single daily dose for 7-10 days.

All treatments must be followed by progestin coverage (10mg MPA daily) along with oestrogen for 7 days.

Treatment (Chronic DUB - not actively bleeding)

1. Iron therapy: elemental iron maximum 60 mg 3 times a day depending on the degree of anaemia.
2. Histopathological diagnosis is must before starting hormonal therapy in all cases except puberty menorrhagia.

A. Anovulatory DUB

1. If contraception is desired: OCPs for 3 - 6 cycles Or Norethisterone 5-10mg.
2. Medroxyprogesterone acetate (MPA) 10 mg 16-25th day of the cycle for 3-6 cycles.
3. In cases of endometrial hyperplasia without atypia on histology Norethisterone acetate 5 mg three times a day or MPA 10mg twice a day 5-25th day of cycle for 3-9 cycles followed by repeat endometrial biopsy.
4. If fertility desired: ovulation induction is advised.
5. Levonorgestrel IUCD can be offered after counselling and is beneficial in DUB.

B. Ovulatory DUB

1. NSAIDs: Mefenamic acid 500mg 3 times a day for 3 -5 days during periods.

Or

Oral combined contraceptive pills if contraception is desired.

If the above treatment is not effective in first cycle patient should be referred for tertiary care by a gynaecologist. Following treatment can be considered as an alternative to surgery:

Tab. Danazol 200 mg daily for 3 months. Levonorgestrel IUCD can be offered after counselling and is beneficial in DUB.

Follow up

Follow up is done after 1, 3, 6 months of therapy. Treatment is stopped after 3-6 months. If symptoms recur medical treatment is to be continued or surgery can be offered.

Role of surgery - endometrial curettage

Acute bleeding in haemodynamically unstable patient to quickly control the bleeding.

In acute episode if bleeding doesn't decrease significantly in 12-24 hours with medical treatment, then reevaluation is mandatory and surgical curettage should be done.

If age is >35 years - premenstrual dilatation and curettage for endometrial histology is a must to rule out endometrial pathology.

Definitive therapy

If medical therapy is not effective then endometrial ablation or hysterectomy is to be performed.

References

1. Dysfunctional Uterine Bleeding, In: Clinical Gynecologic Endocrinology and Infertility, Leon Speroff, Robert H Glass, Nathan G Kase (eds), 1994, pp 531 - 546.
2. Menstruation and Menstrual Disorders. In: Gynaecology, Shaw Robert, Soutter PW, Stanton SL (eds), 2003, pp 459-476.

MENOPAUSE

Permanent cessation of menses for 1 year is known as menopause. Mean age being 48 years.

Clinical Features

Hot flushes, night sweats, palpitations, vaginal dryness, itching, atrophy of the breast and skin, urethral syndrome, stress incontinence, mood changes like anxiety, irritability, depression, insomnia and joint pains.

Diagnosis is always clinical, however, in doubt endocrine evaluations for serum FSH levels and serum oestradiol levels may be helpful.

Treatment

Nonpharmacological

- Balanced diet with fruits, vegetables, semi-skimmed milk adequate in vitamins and minerals. A reduction or avoidance of smoking and alcohol consumption.
- Exercise: walking or swimming for 20-30 min every day.

Pharmacological

1. Tab. Calcium 1500 mg daily.
2. Hormone replacement therapy (HRT).

Rule out contraindications to HRT namely

- Present endometrial/breast cancer,
- Acute phase myocardial infarction
- Undiagnosed breast lump/abnormal vaginal bleeding

- Acute liver disease.

Hypertension and diabetes if present should be controlled before HRT is prescribed.

Oestrogen therapy

i. Single therapy with oestrogens in hysterectomized patients.

Conjugated equine oestrogen 0.625 -1.25 mg.

Or

Oestril 1-2 mg is given daily 1-25th day every month or daily without any break. If symptoms recur during drug free period then give continuous therapy.

Or

Transdermal oestradiol patch 50 or 100 mcg/day applied twice a week away from breast, preferably on the shaved skin of buttock, thigh or legs (Limiting factor is local skin reactions).

Transdermal oestradiol patch is preferred in case of gall bladder disease, hypertriglyceridaemia, history of thromboembolism, poorly-controlled hypertension, recent myocardial infarction, vascular diseases, migraine, chronic hepatic dysfunction, malabsorption syndrome.

II. Combined therapy with oestrogens and progestin in women with intact uterus.

a. Oestrogen therapy as above.

b. Progestogen-Medroxyprogesterone acetate 5 - 10 mg, **Or**

Dihydrogesterone 10 - 20 mg or Norethisterone 2.5 mg) **Or**

200 mcg micronized Progesterone is added from 13th to 25th days in cyclic sequential regimen and 1st to 12th of every month in continuous sequential regimen.

If withdrawal bleeding is not acceptable then give continuous combined treatment (0.625 mg conjugated equine oestrogen + 2.5 mg Medroxyprogesterone acetate Or 1 mg micronized oestrogen + 100 mcg micronized progesterone).

If conventional HRT is contraindicated

Tab. Tibolone 2.5 mg per day (major side effects are weight gain, oedema, breast tenderness, GIT symptoms and vaginal bleeding).

In symptomatic elderly women with atrophic vaginitis and other urogenital symptoms who do not desire long term HRT:

Oestril cream daily application of 0.5 g delivering 0.5mg of oestril for 3 weeks followed by twice weekly application for 3 - 4 weeks.

Key indicator of response to therapy are improvement in symptoms.

Followup at 2-3 months then at 6 monthly interval. Yearly mammography, Pap's smear, pelvic USG and serum estradiol are advisable.

Short term treatment is advocated for acute symptoms and oestrogen use for long term benefits is controversial.

References

1. Treatment of the Post Menopausal Woman: Basic and Clinical Aspects. Rogerio A Lobo (ed), Lippincott Williams and Wilkins, 1999.
2. Menopause and Postmenopausal Hormone Therapy. In: Clinical Gynaecologic Endocrinology and Infertility, Leon Speroff, Robert H Glass, Nathan G Kase (eds), 1994, pp 583-650.
3. The Menopause. In: Gynaecology. Shaw Robert, Soutter PW, Stanton L (eds), 2003, pp 415-432.

POSTMENOPAUSAL BLEEDING

Postmenopausal bleeding (PMB) is bleeding that occurs after menopause has been established for at least one year.

Causes

- HRT
- Endometrial cancer (5-10%)
- Endometrial polyps,
- Cervical cancer;
- Cervical lesions,
- Uterine- tumours,
- Ovarian cancer or oestrogen secreting tumors in other parts of the body.
- Vaginal atrophy
- Lesions and cracks on the vulva
- Bleeding after intercourse

Diagnosis by

- Endometrial or cervical biopsy
- Saline infusion sonography (sis)
- Dilatation and curettage (d & c)

Treatment

Treatment depends on the cause (Table 15.10)

Table 15.10. Treatment of postmenopausal bleeding according to cause

Cause	Treatment
Benign and malignant neoplasm of vulva, uterus or ovaries	Refer to higher centre or treat vagina, cervix, according to cause and facilities available.
Indiscriminate use of oestrogen for HRT	Stop oestrogen therapy
Infections	Antibiotics
Injuries	Repair
Coagulation disorders	Treat accordingly
Endometritis	Antibiotics
Postmenopausal atrophic vaginitis	Vaginal oestrogen cream/ointment

Indication for referral to a higher level of care

Urgent referrals:

- Palpable pelvic mass or lesions suspicious of cancer on vulva or vagina or cervix on examination or on ultrasound.
- More than one or a single heavy episode of PMB in women aged >55 years (not on HRT).

- Postcoital bleeding (PCB) in a woman aged >35 years that has persisted for more than 4 weeks. -
- Prolonged or unexpected bleeding that persists for more than 4 weeks after stopping HRT.

Early Referral (within 4-6 weeks)

- Any other woman with PMB not on HRT who does not satisfy the criteria for 'urgent referral' of postmenopausal bleeding.
- Unexplained repeated postcoital bleeding.

Note - in women over 45 years with persistent abdominal distension or pain, ovarian cancer should be considered and therefore a pelvic examination should be performed.

If excessive bleeding, give hemostatic drugs (oral or intravenous)

Postmenopausal bleeding that is not due to cancer and cannot be controlled by any other treatment usually requires a hysterectomy.

Reference

1. Post Menopausal Bleeding. In: Gynaecology. Robert Shaw, W Patrick Soutter, Stuart L Stanton (eds), 2003, Churchill Livingstone, pp 103-116.

CARCINOMA CERVIX

Invasive cancer of the uterine cervix is the leading cause of death from cancer among women in developing countries. There are two main types: squamous cell carcinoma (about 85%) and adenocarcinoma (15%).

Clinical Features

- Abnormal bleeding may present with postcoital, intermenstrual or post menopausal bleeding;
- Smelly vaginal discharge not responding to treatment may also occur;
- Pain and urinary symptoms occur late in the course of disease.
- Growth or ulcer seen on the cervix, and is friable and bleeds on touch.

Investigations

- Cervical biopsy.
- Haemogram,
- Urine examination,
- Kidney function tests,
- Chest radiography,
- Intravenous pyelogram (ivp),
- CT/MRI scan,
- Cystoscopy, proctosigmoidoscopy,
- HIV testing (especially for the younger, at-risk patient) after counselling and consent.

Screening tests are performed to detect pre-invasive lesions.

- Pap smear - most effective

- VIA (visual inspection after acetic acid) - inspection of cervix after application of 1% acetic acid can also detect pre-invasive lesions.
- Colposcopy - needs special equipment and trained personnel; it is reserved for patients with abnormal Pap smear.
- Schiller test- application of Lugol's iodine demarcates abnormal areas on cervix.

Staging of cancer of the cervix

This is done after thorough clinical examination.

Stage I tumours: tumour confined to cervix.

Stage II tumours: the tumour has spread into surrounding structures-upper part of the vagina or tissues next to the cervix (parametrium).

Stage III tumours: the tumour has spread to surrounding structures-lower part of the vagina, nearby lymph nodes, or tissues at the sides of the pelvic area. Sometimes a tumour that has spread to the pelvis may press on one of the ureters. There may then be a build up of urine in the kidney.

Stage IV tumours: the tumour has spread to the bladder or bowel or beyond the pelvic area. This stage includes tumours that have spread into the lungs, liver or bone.

Grading of cervical cancer

Grading is done by a histopathologist. There are three grades:

Grade 1 (low grade)-slowly growing and less likely to spread

Grade 2 (moderate grade)

Grade 3 (high grade)-grow more quickly and are more likely to spread.

Treatment

All three treatment modalities surgery, radiotherapy and chemotherapy are used in treatment of cancer cervix.

Stage I

The results of surgery and radiotherapy are similar in stage I. The surgical procedure is radical hysterectomy with pelvic lymphadenectomy and is generally preferred in young patients as ovaries can be saved from radiation. Radiotherapy is preferred in older patients who may be at high risk for surgery and may be accompanied or preceded by chemotherapy.

Stage II

Radiotherapy is usually the preferred treatment. It is usually given in combination with chemotherapy. Radiotherapy may also be used after surgery (sometimes with chemotherapy) if there is a high risk of recurrence, for example if the lymph glands were affected. Bulky tumours do better with chemotherapy.

Stage III & IV

Radiotherapy is the main treatment modality in this stage may be given alone or with chemotherapy.

Invasive cervical carcinoma during pregnancy

Occurs in about 3% of cases. Patients with carcinoma-in-situ of the cervix diagnosed by cytology and colposcopic-directed biopsies can be followed throughout the pregnancy and definitive treatment can be delayed until after reevaluation of the cervix 6 weeks postpartum. When there is suspicion of micro

invasive or invasive carcinoma, a biopsy should be performed for diagnosis even during pregnancy. Micro invasive carcinomas can be followed throughout the pregnancy. Early pregnancy upto 20 weeks is ignored for treatment purpose and adequate surgery or radiotherapy can be given depending upon the stage. In late second trimester, pregnancy can be taken upto period of viability, however, chemotherapy can be considered. Foetus delivered after viability and then appropriate surgical treatment at same sitting or radiotherapy/chemo-radiotherapy after 2 weeks can be instituted. In third trimester, patient can be delivered by classical caesarean section followed by surgery in operable cases or radiotherapy/chemo-radiotherapy after 2 weeks can be given.

References

1. Malignant Disease of Cervix. In: Shaw's Gynaecology. Shaw Robert, Soutter PW, Stanton SL (eds), Churchill Livingstone, London, 3rd Edition, 2003, pp 58-599.
2. Invasive Cervical Cancer. In: Clinical Gynaecologic Oncology, Disaia, Creasman (eds), 5th Edition 1997, Mosby, pp 51-106.

CHAPTER 16

PSYCHIATRIC CONDITIONS

SCHIZOPHRENIA AND ACUTE PSYCHOTIC DISORDER

Schizophrenia is a psychotic disorder, characterized by disturbances in thinking, emotions and perception and disorganized behaviour.

Clinical features

- Socially disorganized behaviour (abusive, aggressive, violent, destructive, roaming aimlessly).
- Talking irrelevantly, suspiciousness, fearfulness, thoughts of being harmed or controlled by some external agencies.
- Laughing, smiling or crying without any obvious reason. Muttering or talking to self or imaginary figures.
- Remaining quiet and withdrawn, neglecting personal care and disturbed sleep. Symptoms of schizophrenia are often present for a long time varying from a few months to many years. In acute psychotic disorder, duration varies from a few days to weeks.

Treatment

Nonpharmacological

- Psychological support by family
- Psychoeducation

Pharmacological

Goals of treatment in acutely violent patients

- Prevent harm
- Control disturbed behaviour
- Reduce the severity of psychosis and associated symptoms, viz. agitation, aggression, negative symptoms, and affective symptoms.
- Determine and address the factors that led to the occurrence of the acute episode. Effect a rapid return to the best level of functioning.
- Develop alliance with the patient and family. Formulate short- and long-term treatment plan.
- Connect the patients with appropriate after care in the community.

In a newly diagnosed case, select medication depending on the following factors: Prior response to treatment; past experience of side effects; side effect profile of the prospective medication; patients' preference for a particular medication including route of administration; availability of the medicine locally.

Treatment can be started as below:

Tab. Risperidone 1 mg/day, gradually increased to 2-4 mg/day in 2 divided doses after 2-4 days, which can be further increased depending on tolerability and clinical response (Usual therapeutic dose 4-8 mg/day, though most patients are likely to respond at 4 mg/day).

Or

Tab Olanzapine 5 mg/day as a single night-time dose; can be gradually increased up to 20 mg/day over 2-3 weeks depending on response and tolerability. Usual therapeutic dose is 10-20 mg/day

(**Caution:** Olanzapine has a potential to cause hyperlipidaemia and precipitate diabetes mellitus. Patients on olanzapine may require lipid and blood sugar monitoring every 6 months)

Or

Tab. Aripiprazole 5-10 mg/day as a single night dose, can be increased up to 30 mg/day over 2-3 weeks depending on response and tolerability.

Or

Tab. Quetiapine 100-200 mg/day as a single night dose, can increase up to 600 mg/ day over 2-3 weeks depending on the response and tolerability.

Or

Tab. Haloperidol 5 mg/day, which can be increased up to 10 mg/day (in 2 divided doses) over 1-2 weeks.

Or

Tab. Trifluoperazine 10 mg/day, which can be increased to 15-20 mg/day (in 2- 3 divided doses) over 1-2 weeks.

Tab Clozapine 50-400 mg/day can be used in resistant/refractory cases of schizophrenia.

Tab Lurasidone 40-80 mg/day can be increased to 160 mg/day.

Risperidone and olanzapine have been associated with weight gain when used for long period. Patients should be encouraged for lifestyle modification like regular physical exercise, diet control.

In case of acute excitement or violent behaviour, the patient may be given Inj. Haloperidol 5-10 mg IM Stat. + Inj. Promethazine chloride 25-50 mg IM.

Or

Inj Olanzapine 10 mg IM

Or

Inj Lorazepam 2 mg IM

The injection can be repeated after 8 hours.

The antipsychotic medicine may cause mild to moderate side effects like sedation, slowness of movements, changes in facial expression and gait, rigidity, excessive salivation, dryness of mouth and constipation. Patient usually develops tolerance to these over a few weeks.

If the patient develops extrapyramidal symptoms like tremors, parkinsonian face, sialorrhoea, add

Tab. Trihexyphenidyl 2 mg once in morning and once in afternoon (attempts may be made to taper it off after 3 months)

For sleep disturbance, give

Tab. Lorazepam 1-2 mg or clonazepam 0.25-1 mg at bedtime may be given in the initial period

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(usually for 10-15 days, to be tapered off thereafter).

For non drug compliant patients long acting antipsychotic medicines like fluphenazine, zuclopenthixol, olanzapine and risperidone can be given as IM injection at an interval of 15 days to 1 month.

Electroconvulsive Therapy should be considered in resistant cases or cases of catatonic schizophrenia.

References

1. Taylor D, Paton C, Kapur S. The Maudsley Prescribing Guidelines, 10th Edition. Informa Healthcare: London 2009; pp. 9-122.
2. Sadock BJ, Sadock VA. Kaplan and Sadock's Synopsis of Psychiatry, 10th Edition, Lippincott Williams and Wilkins: Philadelphia 2007; pp. 467-497.
3. Stein D, Lerer B, Stahl S. Evidence Based Psychopharmacology. Cambridge University Press: Cambridge 2005; pp. 56-87.
4. National Institute for Clinical Excellence (NICE) Guidelines for Treatment of Mental Disorders. <http://guidance.nice.org.uk/topic/behavioural> accessed on 20.9.12.
5. American Psychiatric Association Practice Guidelines for the Treatment of Psychiatric Disorders: Compendium 2006. APPI: Arlington. http://www.psych.org/psych_pract/treatg/pg/prac_guide.cfm accessed on 20.9.12.

BIPOLAR AFFECTIVE DISORDER

The illness is characterized by episodes of mania and depression or mania alone with intervening periods of normalcy.

Clinical Features

Episodes of mania are characterized by:

- Elevated, expansive or irritable mood,
- Inflated self-esteem, or grandiosity,
- Decreased need for sleep,
- Overtalkativeness, overactivity,
- Interfering behaviour,
- Excessive involvement in pleasurable activities that have a potential of harmful consequences (buying sprees, sexual indiscretions).

Symptoms should be present for a minimum duration of one week for a diagnosis of mania to be made (for details about depressive episodes see section on Depression).

Treatment

Treatment is for the current episode and for prophylaxis, since the episodes tend to recur. Prophylaxis is usually indicated, if there are more than 2-3 episodes in the previous 4-5 years.

In patients of bipolar affective disorder already on treatment, the same may be continued. Patient should preferably be referred to a psychiatrist.

In a newly diagnosed case, treatment can be started as below:

Tab. Risperidone 1 mg/day gradually increased to 2-4 mg/day in 2 divided doses after 2-4 days, which can be further increased depending on tolerability and clinical response (Usual therapeutic dose 4-8 mg/day, though most patients are likely to respond at 4 mg/day)

Or

Tab Olanzapine 5 mg/day as a single night-time dose; can be gradually increased up to 20 mg/day over 2-3 weeks depending on response and tolerability. Usual therapeutic dose is 10-20 mg/day

(**Caution:** Olanzapine has a potential to cause hyperlipidaemia and precipitate diabetes mellitus. Patients on olanzapine may require lipid and blood sugar monitoring every 6 months.)

Or

Tab. Haloperidol 5 mg/day, which can be increased up to 10 mg/day (in 2 divided doses) over 1-2 weeks.

Or

Tab. Divalproex (combination of sodium valproate and valproic acid) and lithium carbonate are other medications (mood stabilisers), also used for treatment of mania, but should be used only under strict psychiatric supervision.

Risperidone and olanzapine have been associated with weight gain when used for long period. Patients should be encouraged for lifestyle modification like regular physical exercise, diet control.

If the patient develops extrapyramidal symptoms like tremors, parkinsonian face, sialorrhoea while on antipsychotics; add,

Tab. Trihexyphenidyl 2 mg once in morning and once in afternoon (attempts may be made to taper it off after 3 months)

For sleep disturbance

Tab. Lorazepam 1-2 mg or Clonazepam 0.25-1 mg at bedtime may be given in the initial period (usually for 10-15 days, to be tapered off thereafter). In case of acute excitement or violent behaviour, the patient may be given

Inj. Haloperidol 5-10 mg IM Stat.+ Inj. Promethazine chloride 25-50 mg IM Or

Inj Olanzapine 10 mg IM Or

Inj Lorazepam 2 mg IM

The injection can be repeated after 8 hours.

Improvement starts within one week. The treatment may need to be given for period of 3-6 months, usually at least for 3-4 months after the patient becomes asymptomatic. If there is no improvement in a week, the patient should be referred to psychiatrist.

Current episode of depression

Line of treatment is similar to that as described under depression section. However, the patients of bipolar depression should also be prescribed mood stabiliser along with the antidepressant.

Prophylactic treatment

Tab. Lithium carbonate 900-1500 mg/day in 2-3 divided doses.

Or

Tab. Carbamazepine 600-1200 mg/day in 3 divided doses.

Or

Tab. Sodium valproate or divalproex 500-1500 mg/day in 2-3 divided doses.

Tab Lamotrigine 50-400 mg in 2-3 divided doses

Tab Topiramate 50-300 mg in 2 divided doses.

Electroconvulsive therapy should be considered in depression with suicidal intention.

Note: Prophylactic treatment should only be given under psychiatric supervision. Prophylaxis is required generally after 2-3 episodes. Prophylactic treatment may continue for a duration varying from 3 years to lifelong. Patients on lithium require regular blood level monitoring. Liver function test and blood cell counts should be performed at baseline and once in 6 months in patients on carbamazepine and sodium valproate.

References

1. Taylor D, Paton C, Kapur S. The Maudsley Prescribing Guidelines, 10th Edition. Informa Healthcare: London 2009; pp 123-154.
2. Sadock BJ, Sadock VA. Kaplan and Sadock's Synopsis of Psychiatry, 10th Edition, Lippincott Williams and Wilkins: Philadelphia 2007; pp. 527-561
3. Canadian Network for Mood and Anxiety Treatments (CANMAT) and International Society for Bipolar Disorders (ISBD) collaborative update of CANMAT guidelines for the management of patients with bipolar disorder: update 2009. Bipolar Disorders 2009; 11: 225-255.
4. National Institute for Clinical Excellence (NICE) Guidelines for Treatment of Mental Disorders. <http://guidance.nice.org.uk/topic/behavioural> accessed on 20.9.12.
5. American Psychiatric Association Practice Guidelines for the Treatment of Psychiatric Disorders: Compendium 2006. APPI: Arlington. http://www.psych.org/psych_pract/treatg/pg/prac_guide.cfm accessed on 20.9.12.

DEPRESSION

Depression is one of the commonest psychiatric disorders.

Clinical features

- Sadness of mood, loss of pleasure in activities, which one enjoyed earlier, generalized lack of interest, anxiety is often associated.
- Lack of energy, slowness of thought, decreased concentration and efficiency. Lack of sleep, appetite and libido.
- Ideas of insufficiency, inadequacy and worthlessness, unexplained ideas of guilt, death wishes, suicidal ideas, history of suicidal attempt.
- Disruption of social and occupational functioning.

Symptoms should be present for a minimum period of 2 weeks for a diagnosis of depression to be made.

Treatment

Nonpharmacological

Counselling, reassurance, psychological support, encouragement. Cognitive therapy (to be given by a psychiatrist/clinical psychologist).

Pharmacological

Cap. Fluoxetine 20-60 mg/day as a single dose in morning with food; starting with 20 mg/day which can be increased up to 60 mg/day in increments of 20 mg after 5-6 weeks in case of non-response.

Or

Tab. Sertraline 50-200 mg/day as a single dose in morning with food; starting with 50 mg/day which can be increased up to 200 mg/day after 5-6 weeks in increments of 50 mg in case of non-response.

Or

Tab. Escitalopram 10-20 mg/day as a single dose in morning with food; starting with 5 mg/day which can be increased to 10 mg/day over a week, and further up to 20 mg/day after 5-6 weeks in case of non-response. Most patients would respond at 10 mg/day.

Or

Tab. Venlafaxine 75 mg/day, can be increased up to 225 mg/day.

Or

Tab. Mirtazapine 15-45 mg/day as a single night-time dose starting with 15 mg/day which can be increased up to 45 mg/day in increments of 15 mg after 5-6 weeks in case of non-response.

Or

Tab Vilazodone 10-40 mg/day can be increased upto 80 mg/day.

Or

Tricyclic antidepressants (TCAs) like Tab. Imipramine or Tab. Amitriptyline 75-150 mg/day in 2-3 divided doses; to be started at 25 mg twice a day, and increased by 25 mg every third day till 150 mg/day.

(Caution: TCAs to be avoided in patients with epilepsy, heart disease, glaucoma, and benign prostatic enlargement).

For the first episode of depression, treatment needs to be continued for 6-9 months. Dose may be tapered off over a period of 6-8 weeks. However, if symptoms recur during this period, treatment needs to be continued for another 3-4 months. In case of multiple episodes of depression, treatment may need to be continued indefinitely.

In cases of bipolar depression, patients while on antidepressants may have a sudden switch to mania. In such cases, antidepressants should be stopped immediately.

References

1. Taylor D, Paton C, Kapur S. The Maudsley Prescribing Guidelines, 10th Edition. Informa Healthcare: London 2009; pp 155-228.
2. Sadock BJ, Sadock VA. Kaplan and Sadock's Synopsis of Psychiatry, 10th Edition, Lippincott Williams and Wilkins: Philadelphia 2007; pp. 527-561
3. Stein D, Lerer B, Stahl S. Evidence Based Psychopharmacology. Cambridge University Press: Cambridge 2005; pp. 1-21.
4. National Institute for Clinical Excellence (NICE) Guidelines for Treatment of Mental Disorders. <http://guidance.nice.org.uk/topic/behavioural> accessed on 20.9.12

5. American Psychiatric Association Practice Guidelines for the Treatment of Psychiatric Disorders: Compendium 2006. APPI: Arlington. http://www.psych.org/psych_pract/treatg/pg/prac_guide.cfm accessed on 20.9.12.

DEPRESSION IN CHILDREN

Depression should be suspected in a child presenting with decline in school performance, withdrawal from peers, and increased conflict with peers, siblings, parents and other adults, and irritability. Children may be anxious and tearful and may also present with somatic symptoms.

Treatment should mainly be supportive. Pharmacological treatment is generally not encouraged. TCAs and SSRIs can be used, if depression is severe. Imipramine and Fluoxetine, can be given. Other SSRIs may not be as safe as fluoxetine. Duration of treatment is as described in adult depression.

References

1. Kowatch RA, Emslie GJ, Wilkaitis J, Dingle AD. Mood disorders. In: Child and Adolescent Psychiatry. Sexson SB (ed), Blackwell Publishing: Massachusetts, 2005; pp. 132-153.
2. Taylor D, Paton C, Kapur S. The Maudsley Prescribing Guidelines, 10th Edition. Informa Healthcare: London 2009; pp 253-255.

MIXED ANXIETY DEPRESSION

Presence of both anxiety and depressive symptoms.

Symptoms of autonomic hyperactivity like palpitations, tremors, dry mouth, stomach churning, etc.

Treatment

Nonpharmacological

Psychological support, encouragement, relaxation exercises, yoga, and meditation.

Pharmacological

Antidepressants can be avoided unless the symptoms are severe. A short course of benzodiazepines for 2-3 weeks may suffice. If the patient does not show satisfactory improvement and needs medication for longer time, antidepressant can be started.

Tab. Diazepam 5-20 mg/day or Tab. Lorazepam 1-4 mg/day or Tab. Alprazolam 0.75-1.5 mg/day or Tab. Clonazepam 0.5-1.0 mg/day in 2-3 divided doses.

Treatment should be started at the lowest dose, which can be increased up to the maximum dose to achieve a therapeutic response, but attempt should be to keep it at the minimal possible level. Because of the abuse potential, benzodiazepines should not be given for more than 2-4 weeks.

Or

Tab. Buspirone 30-60 mg/day in 2-3 divided doses. It takes two to three weeks to show its effect.

Or

Tab. Paroxetine 12.5 mg/day as a single daily dose with or without food, usually in the morning, it can be increased up to 37.5 mg/day at the interval of 1 week.

(**Caution:** At least 14 days should elapse between discontinuation of an MAOI intended to treat depression and initiation of therapy with Paroxetine and conversely, at least 14 days should be allowed after stopping paroxetine before starting an MAOI antidepressant).

Or

Cap. Fluoxetine 20-60 mg/day as a single dose in morning with food; starting with 20 mg/day which can be increased up to 60 mg/day in increments of 20 mg after 5-6 weeks in case of non-response.

Or

Tab. Sertraline 50-200 mg/day as a single dose in morning with food; starting with 50 mg/day which can be increased up to 200 mg/day after 5-6 weeks in increments of 50 mg in case of non-response.

Or

Tab. Escitalopram 10-20 mg/day as a single dose in morning with food; starting with 5 mg/day which can be increased to 10 mg/day over a week, and further up to 20 mg/day after 5-6 weeks in case of non-response. Most patients would respond at 10 mg/day.

Treatment may be continued up to a period of 6 months. If no response in 6 weeks, the patient should be referred to a psychiatrist.

Reference

1. Sadock BJ, Sadock VA. Kaplan and Sadock's Synopsis of Psychiatry, 10th Edition, Lippincott Williams and Wilkins: Philadelphia 2007; pp. 571.

GENERALIZED ANXIETY DISORDER

It is more common in women than in men.

Clinical features

- Symptoms of sympathetic overactivity - Palpitations, sweating, dry mouth, increased frequency, abdominal distress
- Sleep disturbance,
- Forgetfulness or worrying too much.
- Persistent anxiety, present all the time.
- Tremulousness, shakiness, generalized aches, restlessness.
- Apprehension, worries of future, irritability, sleeplessness.

Intensity, duration and frequency of the anxiety and worry are far out of proportion to the actual likelihood or the impact of the feared event and it interferes with the task in hand.

Treatment

Nonpharmacological

Reassurance, psychological support, encouragement.

Anxiety management – relaxation exercises, breathing exercises, meditation, and yoga.

Pharmacological

Tab. Diazepam 5-20 mg/day

Or

Tab. Lorazepam 1-4 mg/day

Or

Tab. Alprazolam 0.75-1.5 mg/day in 2-3 divided doses.

Or

Tab Clonazepam 0.5-1.0 mg/day in 2-3 divided doses.

Treatment should be started at the lowest dose, which can be increased up to the maximum dose to achieve a therapeutic response, but attempt should be to keep it at the minimal possible level.

Treatment with above should not be given for more than 2-4 weeks because of the abuse potential.

Or

Cap. Fluoxetine 20-60 mg/day as a single dose in morning with food; starting with 10 mg/day which can be increased to 20-60 mg/day in increments of 20 mg after 5-6 weeks in case of non-response. Most patients may not require more than 20 mg/day.

Or

Tab. Sertraline 50-200 mg/day as a single dose in morning with food; starting with 25 mg/day which can be increased up to 200 mg/day after 5-6 weeks in increments of 50 mg in case of non-response. Most patients may not require more than 50 mg/day.

Or

Tab. Escitalopram 10-20 mg/day as a single dose in morning with food; starting with 5 mg/day which can be increased up to 20 mg/day after 5-6 weeks in case of non-response. Most patients may not require more than 10 mg/day.

(**Caution:** SSRIs may exacerbate anxiety symptoms in the first few days; usually a low dose is required for anxiety disorders).

Or

Tab. Buspirone 30-60 mg/day in 2-3 divided doses. It is effective in 60 to 80% of patients especially in reducing the cognitive symptoms. It takes two to three weeks to show its effect.

Or

Tab. Paroxetine 12.5 mg/day as a single daily dose with or without food, usually in the morning, it can be increased up to 37.5 mg/day at the interval of 1 week.

(**Caution:** At least 14 days should elapse between discontinuation of an MAOI intended to treat depression and initiation of therapy with Paroxetine and conversely, at least 14 days should be allowed after stopping paroxetine before starting an MAOI antidepressant).

Or

Tab. Propranolol 40-80 mg/day in 2 divided doses, given especially if the predominant symptoms are those of sympathetic overactivity.

(**Caution:** To be avoided in patients with history of chronic obstructive airway disease and bronchial asthma).

SSRIs to be used, if the patient needs treatment for longer period. Both SSRIs and benzodiazepines can be started together. Benzodiazepines can be withdrawn over 2-4 weeks, as the

SSRIs take over the effect.

In another approach, buspirone may be combined with benzodiazepines initially as it shows its effect after two to three weeks after which benzodiazepines may be gradually withdrawn.

References

1. Taylor D, Paton C, Kapur S. The Maudsley Prescribing Guidelines, 10th Edition. Informa Healthcare: London 2009; pp. 234-247.
2. Sadock BJ, Sadock VA. Kaplan and Sadock's Synopsis of Psychiatry, 10th Edition, Lippincott Williams and Wilkins: Philadelphia 2007; pp. 622-626.
3. Stein D, Lerer B, Stahl S. Evidence Based Psychopharmacology. Cambridge University Press: Cambridge, 2005; pp. 88-104.
4. National Institute for Clinical Excellence (NICE) Guidelines for Treatment of Mental Disorders. <http://guidance.nice.org.uk/topic/behavioural> accessed on 20.9.12.
5. American Psychiatric Association Practice Guidelines for the Treatment of Psychiatric Disorders: Compendium 2006. APPI: Arlington. http://www.psych.org/psych_pract/treatg/pg/prac_guide.cfm accessed on 20.9.12.

PANIC DISORDER

Panic disorder is a common psychiatric disorder, presenting often in primary care or general medical emergency settings.

Clinical Features

- Discrete episodes of sudden onset of palpitations, chest pain, choking sensations, dizziness, feelings of unreality; often accompanied by fear of dying, losing control.
- Individual attacks last for minutes.
- Not associated with situational trigger and occurs out of the blue.
- Onset and remission of individual attacks spontaneous.
- Often lead to persistent fear of going alone or the situation of attack.

Diagnosis made when several attacks have occurred in previous month.

Treatment

Nonpharmacological

Reassurance, encouragement, psychological support. Muscular relaxation exercises, meditation, yoga.

Cognitive behaviour therapy (to be given by a psychiatrist/clinical psychologist).

Pharmacological

Cap. Fluoxetine 20-60 mg/day as a single dose in morning with food; starting with 10 mg/day which can be increased to 20-60 mg/day in increments of 20 mg after 5-6 weeks in case of non-response. Most patients may not require more than 20 mg/day.

Or

Tab. Sertraline 50-200 mg/day as a single dose in morning with food; starting with 25 mg/day which can be increased up to 200 mg/day after 5-6 weeks in increments of 50 mg in case of non-

response. Most patients may not require more than 50 mg/day.

Or

Tab. Escitalopram 10-20 mg/day as a single dose in morning with food; starting with 5 mg/day which can be increased up to 20 mg/day after 5-6 weeks in case of non-response. Most patients may not require more than 10 mg/day.

(**Caution:** SSRIs may exacerbate anxiety symptoms in the first few days; usually a low dose is required for anxiety disorders).

Or/and

Tab. Alprazolam 1.5-6.0 mg/day in 2-3 divided doses or Tab. Clonazepam 1-4 mg/ day in two divided doses. Treatment started at dose of 0.5-0.75 mg/day and increased every 2-3 days to the minimal effective therapeutic dose.

Or

Tab. Imipramine 50 mg/day in 2 divided doses, increased slowly by 25 mg every two to three days to a maximum dose of 150-250 mg/day.

Or

Tab. Venlafaxine 75-150 mg/day in 2-3 divided doses (max up to 225 mg total per day).

Response may take 2-3 weeks to begin and 8-12 weeks to stabilize. Treatment needs to be given for a minimal period of 8-12 months. Medicines should be tapered off thereafter slowly over a period of 6-8 weeks. If the patient does not show any response in 6 weeks, refer to a psychiatrist.

References

1. Taylor D, Paton C, Kapur S. The Maudsley Prescribing Guidelines, 10th Edition. Informa Healthcare: London 2009; pp. 234-247.
2. Sadock BJ, Sadock VA. Kaplan and Sadock's Synopsis of Psychiatry, 10th Edition, Lippincott Williams and Wilkins: Philadelphia 2007; pp. 587-596.
3. Stein D, Lerer B, Stahl S. Evidence Based Psychopharmacology. Cambridge University Press: Cambridge, 2005; pp. 105-120.
4. National Institute for Clinical Excellence (NICE) Guidelines for Treatment of Mental Disorders. <http://guidance.nice.org.uk/topic/behavioural> accessed on 20.9.12.
5. American Psychiatric Association Practice Guidelines for the Treatment of Psychiatric Disorders: Compendium 2006. APPI: Arlington. http://www.psych.org/psych_pract/treatg/pg/prac_guide.cfm accessed on 20.9.12.

SOCIAL PHOBIA OR SOCIAL ANXIETY DISORDER

Social phobias often start in adolescence and are centred around fears of scrutiny by other people in comparatively small groups rather than in crowds.

Clinical Features

- Strong and persistent fear of social or performance situations in which embarrassment or humiliation may occur and avoidance of such situations. Fear considered irrational by the individual.
- Anticipatory anxiety before such exposure. Exposure leads to panic attack.

Treatment

Nonpharmacological

- Reassurance, encouragement, psychological support.
- Muscular relaxation exercises, meditation, yoga.
- Cognitive behaviour therapy (to be given by a psychiatrist/clinical psychologist).
- Social skill training (to be given by a psychiatrist/psychiatric social workers).

Pharmacological

Tab. Paroxetine 12.5 mg/day as a single daily dose with or without food, usually in the morning, it can be increased up to 37.5 mg/day at the interval of 1 week.

(Caution: At least 14 days should elapse between discontinuation of an MAOI intended to treat depression and initiation of therapy with paroxetine and conversely, at least 14 days should be allowed after stopping paroxetine before starting an MAOI antidepressant.

Or

Benzodiazepines like: Tab. Alprazolam 1.5-6.0 mg/day in 2-3 divided doses or Tab. Clonazepam 1-4 mg/day in 2 divided doses. Treatment started at dose of 0.5-0.75 mg/ day and increased every 2-3 days to the minimal effective therapeutic dose.

Or

Tab. Venlafaxine 75-150 mg/day in 2-3 divided doses (max up to 225 mg total per day).

Or

Tab. Propranolol 10-20 mg 1 hour before the performance. Treatment needs to be continued for about one year. If no response in 8 weeks, patient should be referred to a psychiatrist.

Or

Cap. Fluoxetine 20-60 mg/day as a single dose in morning with food; starting with 10 mg/day which can be increased to 20-60 mg/day in increments of 20 mg after 5-6 weeks in case of non-response. Most patients may not require more than 20 mg/day.

Or

Tab. Sertraline 50-200 mg/day as a single dose in morning with food; starting with 25 mg/day which can be increased up to 200 mg/day after 5-6 weeks in increments of 50 mg in case of non-response. Most patients may not require more than 50 mg/day.

Or

Tab. Escitalopram 10-20 mg/day as a single dose in morning with food; starting with 5 mg/day which can be increased up to 20 mg/day after 5-6 weeks in case of non-response. Most patients may not require more than 10 mg/day.

(Caution: SSRIs may exacerbate anxiety symptoms in the first few days; usually a low dose is required for anxiety disorders).

References

1. Sadock BJ, Sadock VA. Kaplan and Sadock's Synopsis of Psychiatry, 10th Edition, Lippincott Williams and Wilkins: Philadelphia 2007; pp. 597-603.
2. Taylor D, Paton C, Kapur S. The Maudsley Prescribing Guidelines, 10th Edition. Informa Healthcare: London 2009; pp. 234-247.

3. Stein D, Lerer B, Stahl S. Evidence Based Psychopharmacology. Cambridge University Press: Cambridge, 2005; pp. 137-164.

OBSESSIVE COMPULSIVE DISORDER

Obsessive compulsive disorder is characterized by obsessions and compulsions and often tends to be chronic.

Clinical features

- Recurrent obsessional thoughts may present in form of repetitive ideas, images or impulses (e.g. constantly thinking that the door has been left unlocked). Perceived as senseless by the sufferer, who feels distressed and tries to resist them unsuccessfully.
- Compulsive acts are repetitive behaviour which are not enjoyable and do not result in the completion of inherently useful tasks (e.g. constantly going back to check the door lock) and cause marked anxiety and distress in the individual.
- Significantly interfere with the person's normal routine, occupational (or academic) functioning, or usual social activities or relationship.

Treatment

Nonpharmacological

- Counselling, reassurance, support
- Cognitive behaviour therapy (to be given by a psychiatrist/clinical psychologist)
- Exposure and response prevention (to be given by a psychiatrist/psychiatric social worker)

Pharmacological

Cap. Fluoxetine 20-60 mg/day as a single dose in morning with food; starting with 10 mg/day which can be increased to 20-60 mg/day in increments of 20 mg after 5-6 weeks in case of non-response. Most patients may not require more than 20 mg/day.

Or

Tab. Sertraline 50-200 mg/day as a single dose in morning with food; starting with 50 mg/day which can be increased up to 200 mg/day after 5-6 weeks in increments of 50 mg in case of non-response. Most patients may not require more than 50 mg/day.

Or

Tab. Escitalopram 10-20 mg/day as a single dose in morning with food; starting with 5 mg/day which can be increased up to 20 mg/day after 5-6 weeks in case of non-response. Most patients may not require more than 10 mg/day.

Or

Tab. Fluvoxamine 50 mg twice a day to be increased to 100-200 mg twice a day in 1-2 weeks.

(**Caution:** SSRIs may exacerbate anxiety symptoms in the first few days; usually a low dose is required for anxiety disorders).

Or

Tab. Clomipramine 75-150 mg/day in single or divided doses; to be started with 25 mg twice a day, increased by 25 mg/day every third day till 150 mg/day (to be avoided in patients with epilepsy,

heart diseases, glaucoma, and benign prostate hypertrophy).

In the initial 2-4 weeks of treatment, one may need to add benzodiazepines like diazepam, lorazepam or alprazolam, if anxiety symptoms are troublesome. These can be given in doses as describe under generalised anxiety disorder.

In resistant cases augmentation treatment with atypical antipsychotics like risperidone should be considered.

Anxiety and distress are the first symptoms to respond. Obsessive and compulsive symptoms respond later. Doses of SSRIs required are often higher than in depression and response is slower than in depression. If no response is seen within 6-8 weeks, the patient should be referred to a psychiatrist.

References

1. Taylor D, Paton C, Kapur S. The Maudsley Prescribing Guidelines, 10th Edition. Informa Healthcare: London 2009; pp. 234-247.
2. Sadock BJ, Sadock VA. Kaplan and Sadock's Synopsis of Psychiatry, 10th Edition, Lippincott Williams and Wilkins: Philadelphia 2007; pp. 604-611.
3. Stein D, Lerer B, Stahl S. Evidence Based Psychopharmacology. Cambridge University Press: Cambridge, 2005; pp. 165-203.
4. National Institute for Clinical Excellence (NICE) Guidelines for Treatment of Mental Disorders. www.nice.org.uk
5. American Psychiatric Association Practice Guidelines for the Treatment of Psychiatric Disorders: Compendium 2006. APPI: Arlington. www.psych.org/psych_pract/

ACUTE STRESS REACTION

Acute stress reaction and disorder follow immediately a stressful event of exceptional nature and are characterized by severe anxiety symptoms accompanied by a daze. The symptoms last only for a short period varying from few hours to days.

Clinical Features

- Marked symptoms of anxiety and increased arousal.
- An initial state of daze followed by depression, anxiety, anger, despair, over activity and withdrawal.
- Clinical picture often changes rapidly with a mixture of the above mentioned symptoms.
- Symptoms appear usually within a few minutes of the impact of the stressful event and resolve rapidly, if stressor is removed, and within 1-3 days, even if it is not.
- Triggered by an overwhelming traumatic experience (e.g. natural catastrophe, accident, battle, criminal assault, rape, multiple bereavement or domestic fire, etc

Treatment

Nonpharmacological

- Address the individual's requirements for medical care, rest, nutrition, and control of injury-related pain and establish a safe environment.
- Detailed recollection of the traumatic event—psychological debriefing. General support, reassurance, and assistance with coping resources.

Pharmacological

No significant role of medications. One may use diazepam 2.5-5 mg on as and when required basis and increased, if necessary, to 15-30 mg daily in divided doses; elderly (or debilitated) half the adult dose, if anxiety symptoms or the distress are uncontrollable. If insomnia is troublesome, 5-15 mg at bedtime.

References

1. Sadock BJ, Sadock VA. Kaplan and Sadock's Synopsis of Psychiatry, 10th Edition, Lippincott Williams and Wilkins: Philadelphia 2007; pp. 612-621.
2. Harrison-Read P, Tyrer P, Sharpe M. Neurotic, stress related and somatoform disorders. In: Companion to Psychiatric Studies. Johnstone EC, Cunningham Owens DG, Lawrie SM, Sharpe M and Freeman CPL, (eds), 7th Edition. Churchill Livingstone: Edinburgh 2004; pp. 470-471.
3. American Psychiatric Association Practice Guidelines for the Treatment of Psychiatric Disorders: Compendium 2006. APPI: Arlington. http://www.psych.org/psych_pract/treatg/pg/prac_guide.cfm

POST-TRAUMATIC STRESS DISORDER (PTSD)

Common problem following traumatic events of catastrophic nature. Seen in the victims of natural disasters and major accidents and personal injuries like rape or mugging.

Clinical Features

- Symptoms follow a major traumatic event of threatening or catastrophic nature (natural or manmade disasters) after a delay.
- Symptoms occur within 6 months of the event.
- Repeated reliving of trauma in the form of flashbacks, nightmares, intrusive recollections of the event.
- Emotional numbness, unresponsiveness and detachment from other people. Autonomic hyperarousal and hypervigilance on exposure.

Treatment

Nonpharmacological

- Emotional support, reassurance
- Behaviour therapy with focus on exposure and desensitisation
- Cognitive behaviour therapy

Pharmacological

SSRIs like fluoxetine, sertraline, escitalopram, venlafaxine or mirtazepine are effective in controlling the symptoms. Dosage is similar as in anxiety disorders and depression. Duration of treatment may vary from 6 months to a year depending on the response.

References

1. Sadock BJ, Sadock VA. Kaplan and Sadock's Synopsis of Psychiatry, 10th Edition, Lippincott Williams and Wilkins: Philadelphia 2007; pp. 612-621.
2. Stein D, Lerer B, Stahl S. Evidence Based Psychopharmacology. Cambridge University Press: Cambridge, 2005; pp. 121-136.
3. National Institute for Clinical Excellence (NICE) Guidelines for Treatment of Mental Disorders. <http://guidance.nice.org.uk/topic/behavioural>

4. American Psychiatric Association Practice Guidelines for the Treatment of Psychiatric Disorders: Compendium 2006. APPI: Arlington. http://www.psych.org/psych_pract/treatg/pg/prac_guide.cfm.

INSOMNIA

Common causes include a recent stress, psychiatric illnesses like depression and anxiety disorders, pain in any body part or substance abuse.

Clinical features

- Difficulty in initiating sleep,
- Frequent awakenings from sleep,
- Early morning insomnia or non-restorative sleep.

In the elderly, the physiological reduction in number of hours of sleep does not amount to insomnia.

Treatment

Treat the underlying cause. In both primary insomnia (where no cause is identifiable) and insomnia due to other causes, management includes introducing good sleep hygiene and medications for short period, if required.

Sleep hygiene

- Set a schedule: Go to bed at a set time each night and get up at the same time each morning. Avoid day time naps. Limit daily inbedtime to the usual amount present before the sleep disturbance.
- Avoid large meals near bedtime; eat at regular times daily. No stimulant medication or food beverages (caffeine, nicotine, alcohol, etc.) especially in the evenings. Mild to moderate physical exercise in the morning.
- Relax before going to bed: a warm bath, reading, or another relaxing routine can make it easier to fall sleep. Avoid evening stimulation: substitute television by radio.
- Don't lie in bed awake: If you can't get to sleep, don't just lie in bed. Do something else, like reading, watching television, or listening to music, until you feel tired. Practice evening relaxation routines, such as progressive muscular relaxation or meditation.
- Maintain comfortable sleeping conditions: avoid extreme temperatures.

Pharmacological

Tab. Diazepam 5-10 mg or Tab. Lorazepam 1-2 mg, or Clonazepam 0.25-0.5 mg at bedtime.

Or

Tab. Zolpidem 5-10 mg at bedtime.

Precautions

Medication to be given ½-1 hour before the usual time of going to bed. Medications should be prescribed at the lower dose for a period of 5-7 days. Benzodiazepines have risk of abuse potential if taken for more than 4-5 weeks. Zolpidem has also dependence potential and, therefore, long-term use should be discouraged.

References

1. Sadock BJ, Sadock VA. Kaplan and Sadock's Synopsis of Psychiatry, 10th Edition, Lippincott

Williams and Wilkins: Philadelphia 2007; pp. 753-759.

2. Taylor D, Paton C, Kapur S. The Maudsley Prescribing Guidelines, 10th Edition. Informa Healthcare: London 2009; pp. 248-251.

ATTENTION DEFICIT/HYPERACTIVITY DISORDER

Attention deficit/hyperactivity disorder is one of the commonest psychiatric disorders in children, seen more often in boys.

Clinical Features

- Persistent pattern of hyperactivity or inattention (more frequent and severe than typical of children at a similar level of development).
- Onset usually before 7 years of age.
- Difficulty in sustaining attention in tasks or play activities. Distracted easily by extraneous stimuli.
- Irritability, temper tantrums, impulsivity, does not wait for his turn.

Treatment (to be treated by a psychiatrist)

Pharmacological

Tab. Methylphenidate 2.5-5 mg twice a day after meals at 8 AM and 12 noon; can be increased up to 10-15 mg/day (0.3-2.0 mg/kg/day). Maximum dose 60 mg/day, to be given under strict psychiatric supervision.

Or

Tab. Atomoxetine started with 0.5 mg/kg/day and increased after a minimum of 3 days to 1.2 mg/kg/day, given as a single or two divided doses (morning and afternoon).

(**Caution:** Common side effects include headache, insomnia, nausea, vomiting, decreased appetite and pain abdomen).

References

1. Taylor D, Paton C, Kapur S. The Maudsley Prescribing Guidelines, 10th Edition. Informa Healthcare: London 2009; pp 263-268.
2. Sadock BJ, Sadock VA. Kaplan and Sadock's Synopsis of Psychiatry, 10th Edition, Lippincott Williams and Wilkins: Philadelphia 2007; pp. 1206-1217.
3. Stein D, Lerer B, Stahl S. Evidence Based Psychopharmacology. Cambridge University Press: Cambridge, 2005; pp. 255-289.
4. National Institute for Clinical Excellence (NICE) Guidelines for Treatment of Mental Disorders. <http://guidance.nice.org.uk/topic/behavioural>
5. American Psychiatric Association Practice Guidelines for the Treatment of Psychiatric Disorders: Compendium 2006. APPI: Arlington. http://www.psych.org/psych_pract/treatg/pg/prac_guide.cfm.

ALCOHOL DEPENDENCE SYNDROME

Persisting with drinking despite clear evidence of overtly harmful consequences and withdrawal state.

Clinical Features

- Craving, compulsion to drink, difficulties in controlling alcohol consumption. Tolerance (increasing amount required to achieve the same effect)
- Progressive neglect of alternative pleasures or interests
- Withdrawal symptoms are—tremor, tachycardia, anxiety, sleep disturbance, nausea, vomiting, hallucination, generalised seizure and delirium in severe cases.

Treatment

I. Detoxification (treatment of the withdrawal state and associated problems).

Detoxification can be done in an outpatient or inpatient settings. Outpatient treatment is preferred when the withdrawal state is uncomplicated.

1. Inj. Thiamine 100 mg IM.

Or

Tab. Thiamine orally along with oral multivitamins and Tab. Folate 1 mg.

2. Tab. Chlordiazepoxide 10-40 mg 4 times a day, depending on severity of dependence.

Or

Tab. Diazepam 5-20 mg 4 times a day.

Once the patient is well sedated and stable, the dosage should be decreased 20% per day over a maximum period of two weeks. The patient should be monitored over this period for the appearance of the signs of delirium.

For elderly patients or in presence of significant liver disease, Tab. Oxazepam 15 mg or Tab. Lorazepam 2-4 mg every 6 hour should be started.

Inpatient treatment is advised when withdrawal state is associated with seizures, delirium or emesis, fluid and electrolyte disturbance, medical conditions like pneumonia or surgical problem (e.g. head trauma), hallucinatory behaviour, suicidal risk and previous history of delirium tremens.

The vital signs and withdrawal symptoms should be monitored 2-4 hourly. Once the patient is stable, the dose should be gradually tapered off (20% per day) over a period of 7-10 days.

Treatment of dependence with complications:

Basic treatment will be as described above, but the patient needs to be hospitalised. Guidelines are as below:

1. **Fluid and electrolyte disturbance** should be corrected, especially, if there is vomiting or fever.
2. **Seizures**—Rumfits (appearing within 24 hours of abstinence) can be treated with Inj. Diazepam 10 mg or Inj. Lorazepam 2 mg IV stat especially when seizures are repeated. Prophylactic treatment is not recommended for true alcohol withdrawal fits.
3. **Delirium tremens**—The patient should be preferably treated in an intensive care unit.
 - a. An intravenous line should be started immediately and Inj. Thiamine 100 mg administered IV, or IM. Thiamine along with multivitamin should be continued parenterally till normal diet is resumed. Later oral thiamine should be continued for at least 3-4 months.
 - b. Dextrose and saline IV should be given at a rate adequate to replace fluid losses and

maintain blood pressure.

- c. Hyperthermia should be managed with cold sponge.
Tab. Paracetamol 500 mg PO 4 times a day may be used in absence of any hepatic dysfunction.
- d. Inj. Diazepam 10 mg should be given slowly IV and should be repeated every 15-20 minutes till sedation is achieved.
- e. Physical restraint may be necessary, if the patient is combative.
- f. Associated medical and surgical problems should be simultaneously investigated and treated appropriately.

II. Long-term treatment (to be treated by a psychiatrist)

The goal of this treatment is to help the patient maintain long-term abstinence.

Nonpharmacological

Individual counselling and family support should be planned along with pharmacotherapy. After remission, the patient should be encouraged to join self-help groups like Alcoholic Anonymous (AA).

Pharmacological

Deterrents like disulfiram or anticraving agents like naltrexone or acamprosate are used for long-term treatment of alcohol dependence.

Tab. Disulfiram 250 mg a day may be used, if the patient desires enforced sobriety and who have remained alcohol free for at least 7-10 days.

Patients taking disulfiram develop an extremely unpleasant reaction on intake of even small amounts (e.g. 7 ml) of alcohol. The reaction occurs due to accumulation of acetaldehyde and includes flushing, headache, throbbing in head, dyspnoea, hyperventilation, tachycardia, hypotension, sweating and confusion.

In the event of disulfiram-ethanol reaction (DER), fall in BP should be controlled on priority basis. If DER is mild, assurance and oral fluids suffice. In case of moderate or severe DER, IV fluids are required and some patients may even need dopamine infusion.

Generally, DER does not occur in the first week of disulfiram use and if alcohol is consumed after 5-7 days of stopping disulfiram, but can occur 2 weeks after stopping disulfiram.

Disulfiram should be continued for several months to establish a long-term pattern of sobriety.

Or

Tab. Naltrexone 50 mg orally once daily.

(**Caution:** Baseline hepatic functions should be assessed, and monitored once a month while on naltrexone treatment. The drug is usually continued for a period of 6 months. However, it may have to be withdrawn in presence of significant liver disease (i.e. several fold increase in the serum levels of transaminases).

Or

Tab. Acamprosate (333 mg) 1-2 g/day in 3 divided doses. There is no optimum duration of therapy but benefit beyond 12 months has not been demonstrated. (**Caution:** Contraindicated in severe renal and hepatic failure; reduce dosage in moderate renal impairment; monitor renal and liver function regularly).

References

1. Sadock BJ, Sadock VA. Kaplan and Sadock's Synopsis of Psychiatry, 10th Edition, Lippincott Williams and Wilkins: Philadelphia 2007; pp. 390-406.
2. Taylor D, Paton C, Kapur S. The Maudsley Prescribing Guidelines, 10th Edition. Informa Healthcare: London 2009; pp. 286-298.
3. Lal R (Ed). Substance Use Disorder: Manual for Physicians. National Drug Dependence Treatment Centre, All India Institute of Medical Sciences, New Delhi, 2005; pp. 65-76.

OPIOID DEPENDENCE SYNDROME

Clinical features

- Compulsive need to take the drug
- Tolerance (increasing amount required to achieve the same effect)
- Progressive neglect of alternative pleasures or interests
- Persisting with drinking despite clear evidence of overtly harmful consequences and a withdrawal state (aches and pains, lacrimation, rhinorrhoea, yawning, tachycardia, piloerection, vomiting, loose motions, sleep disturbance and spontaneous ejaculation).

Treatment

Pharmacological

Buprenorphine or dextropropoxyphene can be used for detoxification. The starting dose is decided according to the amount of opioid used by the patient in 24 hours. Subsequent doses need to be adjusted according to the severity of withdrawal symptoms, which usually peak during 3rd – 7th day of withdrawal.

Tab. Buprenorphine 1.2-4.0 mg/day orally in 4-6 divided doses.

Or

Cap. Dextropropoxyphene (65 mg) 2-4 capsules thrice a day.

Tapering off of the medication can be started from the 3rd day onwards, depending on the response. Usually detoxification medicines are required for 2-3 weeks. Withdrawal symptoms may need to be treated symptomatically as under:

Hypnotics (e.g. zolpidem, long-acting benzodiazepines) for sleep disturbance

NSAIDs for aches and pains

Antidiarrhoeals for loose motions

Antiemetics for nausea and vomiting

Fluid and electrolyte balance for electrolyte imbalance

Manage associated physical and mental disorders simultaneously.

Certain withdrawal symptoms like insomnia, restlessness and mild body aches persist even after 3 weeks, and can be managed symptomatically as above and by non-pharmacological interventions like relaxation therapy.

Long-term treatment

Nonpharmacological

Individual counselling, family support and encouraging the patient to join the self-help groups are also important to help him maintain long-term abstinence. However, opiate dependence is a highly relapsing disorder and prolonged inpatient stay in settings that also provide rehabilitative inputs may be required in some cases.

Pharmacological (to be treated by a psychiatrist)

Tab. Naltrexone 50 mg/day orally is used to reduce craving and thereby to help patient maintain long-term abstinence (who have remained opioid free) for at least 7-10 days.

A combination of Buprenorphine 2 mg and Naloxane 0.5 mg is also used for long-term treatment. The drug is dispensed only through the Oral Substitution Treatment (OST) Centres accredited by National AIDS Control Organisation (NACO) or the designated Deaddiction Centres

(Caution: Baseline hepatic functions should be assessed, and to be monitored once a month while on naltrexone treatment. The drug is usually continued for a period of 6 months. However, it may have to be withdrawn in presence of significant liver disease (i.e. several fold increase in the serum levels of transaminases).

References

1. Sadock BJ, Sadock VA. Kaplan and Sadock's Synopsis of Psychiatry, 10th Edition, Lippincott Williams and Wilkins: Philadelphia 2007; pp. 443-449.
2. Taylor D, Paton C, Kapur S. The Maudsley Prescribing Guidelines, 10th Edition. Informa Healthcare: London 2009; pp 299-320.
3. Lal R (Ed). Substance Use Disorder: Manual for Physicians. National Drug Dependence Treatment Centre, All India Institute of Medical Sciences, New Delhi, 2005; pp. 65-76.

NICOTINE DEPENDENCE

Nicotine is abused in the form of tobacco, smoked in bidis, cigarettes and hooka, and chewed as such or in pan masala.

Clinical features

Indicators of dependence include the time from waking to first use. About 15% of the dependent smokers light up within 5 minutes of waking, while almost half of smoke within the first half hour of the day.

Typical physical symptoms following cessation or reduction of nicotine intake include craving for nicotine, irritability, anxiety, difficulty concentrating, restlessness, sleep disturbances, decreased heart rate, and increased appetite or weight gain.

Treatment

Nonpharmacological

Progressively lowering the number of cigarettes smoked or tobacco sachets used daily.

Using past quit experience. Setting a quit date.

Throwing away items such as ashtrays, etc. the night before the quit day dawns, preferably as a ceremonial gesture.

Advise the patient that starting from the quit date, total abstinence is essential. Help the patient identify each of the environmental conditions that most likely lead to tobacco use and then develop a course of behaviour that avoids those conditions or prevents them from occurring.

Suggest that the patient develop an alternate plan to having a cigarette during the morning toilet, smoking after a meal, and smoking to manage stress at work or in traffic, being in an argument, and so on.

The five Ds to handle urges:

- Delay until the urge passes. It usually takes 3-5 minutes
- Distract yourself. Call a friend or go for a walk.
- Drink a glass of water
- Deep breaths—Relax! Close your eyes and take 10 slow, deep breaths
- Discuss your feelings with someone close to you.

Pharmacological

Nicotine gum, one piece of 2 mg gum/hour for light smokers, and 4 mg gum for highly nicotine-dependent smokers.

One piece of gum to be chewed slowly at one time until a peppery taste or tingling of gums occurs. Chewing can be stopped here and the gum is kept between the gums and cheek. The process is repeated over 30 minutes.

One should not eat or drink anything 15 minutes prior to and during the use of the gum. Absorption of nicotine in the buccal mucosa is decreased by an acidic environment. Therefore, patients should not use beverages (e.g. coffee, soda, juice) immediately before, during, or after nicotine gum.

Duration of treatment is 4-6 weeks. The gum is weaned off subsequently by tapering the frequency and strength of the gum over 2-3 months or less.

Or

Tab. Bupropion treatment is begun 1-2 weeks before the quit date. Usual dose is 300 mg/day given in two divided doses. It is started as 150 mg as a single daily dose in morning and increased to 150 mg twice a day on the 4th day. This is continued for 7-12 weeks after the quit date and maintenance therapy may go on for 6 months.

(Caution: It is important that patients continue to receive counselling and support throughout treatment with bupropion, and for a period of time thereafter.)

Adverse effects include feelings of agitation or restlessness that decreases in 1-2 weeks after starting medication. Insomnia, gastrointestinal upset, appetite suppression and weight loss, headache and lowering of seizure threshold also have been reported.

References

1. Sadock BJ, Sadock VA. Kaplan and Sadock's Synopsis of Psychiatry, 10th Edition, Lippincott Williams and Wilkins: Philadelphia 2007; pp. 438-442.
2. Lal R (Ed). Substance Use Disorder: Manual for Physicians. National Drug Dependence Treatment Centre, All India Institute of Medical Sciences, New Delhi, 2005; pp. 104-120.

CHAPTER 17

ORTHOPAEDIC CONDITIONS

OSTEOARTHRITIS (OA) KNEE

Osteoarthritis of the knee is an end result of the degeneration of articular cartilage.

Clinical Features

- Pain, stiffness after rest,
- Difficulty in climbing stairs,
- Difficulty in getting up from squatting position,
- Grating sensations and off and on episodes of flare and swelling.
- Erythema and palpable warmth are possible but rare.
- Genu varum deformity and/or fixed flexion contracture in severe cases.
- Classical radiological triad - joint space narrowing, peripheral osteophyte formation and subchondral sclerosis.

Treatment

Nonpharmacological

- Weight reduction (if overweight); cold fomentation for acutely swollen knee, however, hot fomentation may give symptomatic relief to some chronic patients.
- Supervised non-traumatic muscle conditioning and rehabilitation regimens e.g. isometric quadriceps strengthening exercise (all vigorous exercises to be avoided in acutely swollen/painful knee).
- Compressive bandage or crepe bandage for effusion.
- Assistive devices like cane (to be held in the hand contralateral to more painful side), walker for patients with severe deformities or unsteady gait.

Pharmacological

1. Topical applications- containing salicylates, capsaicin, nicotines, menthol, camphor, NSAIDs in various combinations may provide symptomatic relief. (Caution: Avoid hot fomentation immediately after topical applications).
2. Non-steroidal anti-inflammatory drugs (NSAIDs) for pharmacological pain palliation. The choice of NSAID depends upon dosing convenience, physician and patients comfort, price and the past experience on its frequency and severity of side effects as all are equipotent in full therapeutic dose (Avoid intra-articular or oral steroids).

A. Acute painful situation/moderate pain (for initial 7-14 days), preferably take NSAIDs after meals.

Tab. Paracetamol 500mg 4-6 hourly (maximum daily dose 4000mg).

Or

Tab.Ibuprofen 400-600mg 2 or 3 times a day (maximum daily dose 3200mg).

Or

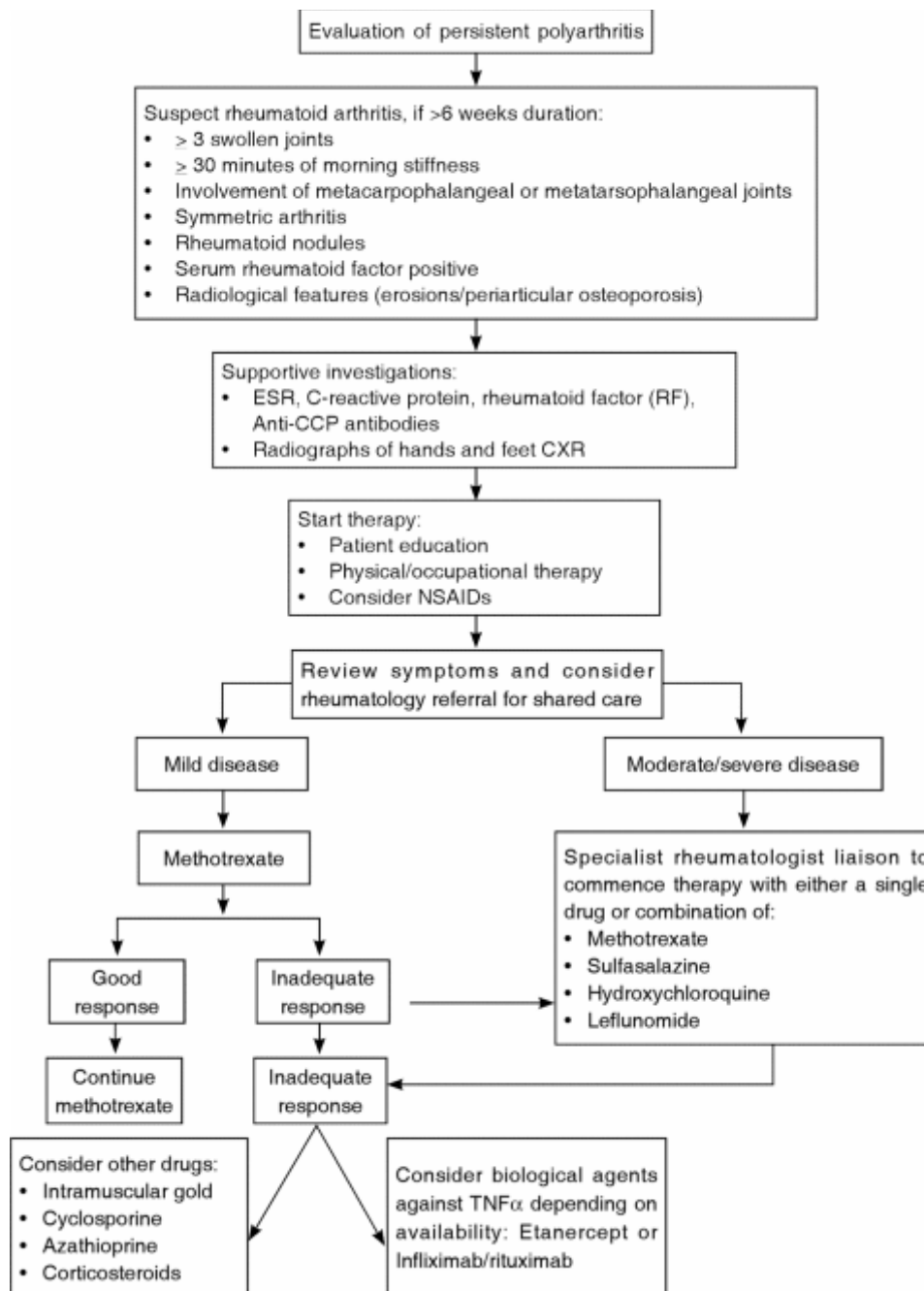


Table 17.1. Commonly used NSAIDs for OA Knee
(358)

Tab.Diclofenac sodium 50mg 3 times a day or 75mg 2 times a day (maximum daily dose 200mg).

Or

Tab.Nimesulide 100mg 2 times a day (maximum daily dose 400mg).

Or

Tab. Aspirin 350mg 2 tablets 4-6 hourly (maximum daily dose 5000mg).

Or

B. For mild to moderate pain/chronic pain control (for 3-6 weeks and then SOS).

1. All above medicines in reduced frequency of dosages.
2. Alternative forms-Tab.Diclofenac sodium 100 mg/75mg sustained release once a day.

Or

Tab. Piroxicam 20mg once a day.

Or

Tab.Nimesulide 100mg 2 times a day.

(Caution: NSAIDs may cause dose related gastric irritation, nausea, vomiting and dyspepsia; GI ulceration, perforation and haemorrhage. However, one-third remain asymptomatic. NSAIDs can interfere with antihypertensive therapy due to salt and water retention).

References

1. Acetabular Bone Destruction Related to NonSteroidal Antiinflammatory Drugs. Lancet 1985;2:11-14.
2. Osteoarthritis. In: Harrison's Principles of Internal Medicine. Kasper D L, Braunwald E, Fauci AS et al (eds), 16th Edition, 2005, McGrawHill Company Inc., New York, pp 2036-2047.
3. Osteoarthritis. In: Conn's Current Therapy, Robert E R akel (ed), 1999, WB Saunder Company, Philadelphia.

RHEUMATOID ARTHRITIS (RA)

Rheumatoid arthritis is characterized by persistent inflammatory synovitis (usually involving small and large peripheral joints in symmetrical fashion) causing cartilage destruction and bone erosion leading to changes in joint integrity. The revised criterion of American College of Rheumatology (1987) aids in diagnosis and classification.

Treatment

Nonpharmacological

In acute pain rest and splint. Otherwise exercises directed at maintaining muscle strength and joint mobility without exacerbating joint inflammation. A variety of orthotic (splints) and assistive devices (cane, walker) can be helpful in supporting and aligning deformed joints to reduce pain and improve function.

Pharmacological (Fig. 17.1)

1. In acute inflammation any of the NSAIDs as given in section on osteoarthritis may be given except Paracetamol. The anti-inflammatory action of the NSAIDs may take 2-4

weeks to become evident.

Reduced NSAID dosages have to be used in the elderly and in patients with impaired renal function.

2. Topical applications- containing salicylates, capsaicin, nicotines, menthol, camphor and NSAIDs in various combinations may provide symptomatic relief.
3. Tab Methotrexate 7.5mg to 15mg every week. Concomitant Folic acid 1 mg/day reduces side effects (give in gradual increment).

(Caution: Nausea, mouth sores, liver damage, increase in incidence of Chest infection, macrocytic anaemia. Regular monitoring of LFT, C B C is required. Avoid alcohol during therapy).

4. Only in patients with severe disease, affecting activities of daily living and not responding to adequate trial of NSAIDs and DMARD for sufficient duration:

Tab. Prednisolone 40-60 mg/day for 2-4 weeks. Review periodically and possibly taper down slowly. If required for a longer duration administer at doses of 5-10mg/day. Deflazacort 6mg 8 hourly can be given alternatively.

Intra-articular corticosteroids: Methylprednisolone acetate, 20-80 mg may be needed in selected cases with predominantly monoarticular arthritis of a large joint.

5. Refer the patient to a higher centre if no response to medical therapy after 4-8 weeks, severe extra-articular symptoms, deformities or contractures present, patient is crippled or not able to carry out activities of daily living despite adequate medical treatment.

Surgical

Synovectomy in patients with predominantly monoarticular involvement, not responding to conservative therapy, might be helpful. Reconstructive surgery is indicated for disorganized joints.

References

1. Rheumatoid Arthritis. In: Harrison's Principles of Internal Medicine. Kasper DL, Braunwald E, Fauci AS et al (eds), 16th Edition, 2005, McGrawHill Company Inc., New York, pp 1968-1977.
2. Rheumatoid Arthritis. In: Conn's Current Therapy. Robert E. Rakel (ed), 1999, WB Saunders Company, Philadelphia.

CERVICAL AND LUMBAR SPONDYLOSIS

Spondylosis is a clinical syndrome resulting from degeneration of intervertebral discs and facet joints.

Clinical Features

- Pain and stiffness with decreased range of movement of gradual onset.
- Occasional acute flare-ups of pain with muscle spasm.
- Neck pain may radiate to occiput, scapular area and down to one or both arms (maybe associated with paraesthesias).
- Back pain is usually diffuse and may radiate up to knees through back of thighs.

Investigations – Radiological narrowing of one or more intervertebral spaces, spur formation (osteophytes) and subchondral sclerosis are the hallmark.

Treatment

Nonpharmacological

- In acute painful situation rest , moist heat in cold weather and light massage (improve tone, circulation and elasticity) to paraspinal muscles.
- Cervical traction in the position of maximum comfort to neck (5-10 pounds) for 10-15 minutes.
- Ultrasonic exposure on painful trigger points in cervical and shoulder muscles. Removable soft cervical collar/back corset/backbelt for symptomatic relief.

(Caution: No exercises in acute painful situation).

- In chronic pain mobilization and strengthening exercises, moist heat and cervical traction.

Pharmacological

Same as described for osteoarthritis of knee.

SPRAINS

An injury to a ligament(s), by sudden unnatural or excessive movement of a joint, is termed as a sprain.

Clinical features

- Mild or grade I sprains- partial tearing of ligament fibers, minimal swelling and no joint instability.
- Moderate or grade II sprains -pain, oedema, ecchymosis, joint tenderness with some loss of joint motion but no joint instability.
- Severe or grade III sprains-gross instability of the joint with complete tearing of all fibers, marked swelling and severe pain.

Treatment

Nonpharmacological

- Check sensation and circulation distal to the injury. Obtain X-rays of the involved region to rule out a fracture, Stress X-rays may show abnormal opening of the joint in a grade III sprain.
- Protection, support and rest.
- Restrict the movement of the affected area.
- Apply cold compresses immediately (this will help to reduce swelling). Avoid using ice directly on the skin.
- Elevation of the limb above the level of the heart-especially at night while sleeping.
- In a grade I sprain, apply a compression bandage for a period of 5-7 days, patient may be allowed to bear weight after a week.
- In a grade II sprain, splintage (slab later on converted to cast) may be used to restrict joint motion, but the patient has to remain non-weightbearing for 4-6 weeks.

Pharmacological

1. Tab. Ibuprofen 400mg 3 times a day for 5-7 days.

Or

Tab. Diclofenac sodium 50mg 3 times a day for 5-7 days.

Or

Tab. Nimesulide 100mg 2 times a day for 5-7 days (in Adults, should be avoided in children).

Refer the patient to an Orthopaedic Surgeon if a fracture is suspected or if there has been a serious injury (grade III sprain with instability) or persistent pain (delayed recovery of grade I or II sprain), there is an audible popping sound and immediate difficulty in using the joint and distal neurovascular status is doubtful.

Reference

1. Apley's System of Orthopaedics and Fractures, 6th edition, 1982, Butterworths and Co. London.

ACUTE PYOGENIC OSTEOMYELITIS

Acute osteomyelitis is acute infection of the bone, commonly seen in children less than 10 years of age. Require aggressive management and timely referral for surgical intervention.

Clinical features

Diagnosis considered if any of the following two criteria are present:

- Classic symptom of localized pain,
- Fever (with or without chills and rigours),
- Swelling in the metaphyseal area,
- Warmth,
- Limited range of motion of the adjacent joint;
- Pus aspirated from the bone;
- Positive bone or blood culture for pyogenic organism;
- Radiographic changes typical of acute osteomyelitis (soft tissue swelling, periosteal reaction, lytic areas in the metaphysis).

The X-ray changes usually appear 7-10 days after the onset of illness.

Treatment

Nonpharmacological

Rest, splintage to the part, elevation of the limb and sponging for fever. If aspiration is positive for pus, drain the pus (must be performed by an orthopaedic surgeon).

Postoperative duration of splintage depends upon extent of damage to the bone.

Usual duration is 4-6 weeks. Gradually mobilize the limb and permit gradual weight bearing thereafter. In case of extensive destruction, bone might require support for a few months.

Pharmacological

Broad spectrum intravenous antibiotics are started depending upon most likely organism present. Commonest bacterial pathogen is *Staphylococcus aureus* (40-80% of cases). The antibiotic later on may

be changed depending upon culture report or response to therapy. Intravenous administration of antibiotics is continued till favourable clinical response is achieved(15 days), followed by oral antibiotics (till 6 weeks). Total duration of antibiotic(s) administration ranges from 4-6 weeks.

1. Inj.Cloxacillin 50-100mg/kg/day in four divided doses for 1-2 weeks.

2. Inj.Gentamicin 5-7.5mg/kg/day in 2 divided doses for 1-2 weeks

Or

Inj. Amikacin 15mg/kg/day in 2-3 divided doses if resistant *Pseudomonas aeruginosa*.

Or

Inj.Ceftriaxone 100mg/kg/day in 2 divided doses for 1-2 weeks (maximum dose 2g/day).

Or

Inj.Cefotaxime 100-200mg/kg/day by IV infusion or IM or IV in 2-4 divided doses for 1-2 weeks.

Or

If patient is hypersensitive to penicillins and cephalosporins,

Inj.Clindamycin 40mg/kg/day in 4 divided doses for 1-2 weeks.

Or

If Methicillin resistant *Staph.aureus* suspected, Inj. Vancomycin by IV infusion 500mg over at least 60 minutes every 6 hours or 1g over at least 100 minutes every 12 hours; Neonates upto 1 week 15mg/kg initially then 10mg/kg every 12 hours; Infants 1-4 weeks 15mg/kg initially then 10 mg/kg every 8 hours; Children over 1 month 10mg/kg every 6 hours.

3. Oral/Inj. Paracetamol for fever(see section on fever in chapter 1).

4. Monitor therapy by clinical response. Favourable response characterized by decrease in swelling and fever, improvement in general well being and movements of limb, fall in ESR and C-Reactive protein (better indicator than ESR because CRP closely follows the clinical response). After 7-10 days of symptoms, repeat the X-ray to assess the extent of destruction and damage to bone. Oral therapy usually started 1-2 weeks of IV antibiotic therapy, if response is favourable. The choice of oral antibiotic largely depends on culture and sensitivity report. In the absence of culture report give oral:

Syr./Cap. Cloxacillin 50-100 mg/kg/day in 4 divided doses for 3-4 weeks. (Monitor compliance as it has bitter taste).

Or

Syr./Cap. Cephalexin 25-50 mg/kg/day in 4 divided doses for 3-4 weeks.

Or

Inj.Clindamycin 25-40mg/kg/day in 4 divided doses for 3-4 weeks.

References

1. A Comparative Study of Osteomyelitis and Purulent Arthritis with Special Reference to Aetiology and Recovery. *Infection*, 1984;12:75.
2. Osteomyelitis and Suppurative Arthritis. In: Nelson's Textbook of Paediatrics. Berhman, Kliegman, Jenson et al (eds), 17th Edition, 2004, W.B. Saunders Company, Philadelphia, pp2297-2302.
3. Bone and Joint Sepsis. In: Lovell and Winter's Paediatric Orthopaedics. Morissy RT, Weinstein SL (eds), Vol.4, 1996, Lippincott-Raven, Philadelphia.

POSTOPERATIVE CARE

Postoperative pain relief

Commonly used agents are:

Inj. Diclofenac sodium 75mg 6-8 hourly.

Or

Inj. Pentazocine (30mg/ml) 30-60mg IM/IV repeated 3-4 hourly.

Or

Inj. Tramadol (50 mg/ml) IM/IV 4-6 hourly,

Or

Inj. Morphine (15 mg/ml) 10-15mg, can be repeated 4-6 times.

In tertiary care centers, epidural analgesia, intravenous patient controlled analgesia, intrapleural analgesia can be used under expert care.

When patient is able to accept orally

Tab. Paracetamol 500mg 3-4 times a day. **Or**

Tab. Ibuprofen 400-600mg 8 hourly. **Or**

Tab. Nimesulide 100mg twice daily.

Transdermal Patch

Diclofenac patch **Or**

Buprenorphine patch **Or**

Fentanyl patch

Postoperative nausea and vomiting

Treatment

Bowel obstruction (mechanical or paralytic ileus) should be ruled out as a cause of vomiting by proper examination and investigations if it is associated with abdominal distension, fever which occurs beyond 3rd postoperative day.

Nausea and vomiting are managed with bedrest, intravenous fluids, analgesics to relieve postoperative pain, nasogastric decompression.

Pharmacological

Inj. Metoclopramide (5mg/ml) 10mg IM/IV 1-3 times daily or SOS.

Or

Inj. Ondansetron (2mg/ml) 4mg slow IV or IM.

In children: 100mcg/kg (max 4mg/day) by slow IV or IM.

Or

Inj. Promethazine (25mg/ml) 2 ml IV SOS.

Or

Inj. Levosulpiride (25mg) IV 8 hrl

Postoperative pneumonia

Factors predisposing to increased chest complications are smoking, obesity, chronic restrictive and obstructive lung disease, prolonged general anaesthesia and presence of nasogastric tube.

Postoperative pneumonia is caused by pathogens such as *Pseudomonas*, *Serratia*, *Klebsiella*, *Proteus* and *Streptococcus*.

Clinical Features

- Fever, productive cough, dyspnoea, chest pain.
- Bronchial breathing and presence of rales.
- Chest X-ray shows areas of consolidation.

Treatment

1. Antibiotics: depending upon sputum culture and sensitivity. Initial treatment can be started with aminoglycoside and antipseudomonas Cephalosporins.
2. Inj. Ketorolac 30mg every 6-8 hours IV or IM

Or

Inj. Diclofenac 75mg IM every 6-8 hours.

3. Chest physiotherapy
4. Nebulized bronchodilators may be used if bronchospasm is present.

Reference

1. Preoperative and Postoperative Management. In: Maingot's Abdominal Operation, Zinner MJ, Schwartz SI, Ellis H, 10th Edition, 1997, Prentice Hall International, pp 461-478.

ANTIBIOTIC PROPHYLAXIS IN SURGERY

Timing and duration of prophylaxis

The first dose should always be given before the procedure, preferably within 30 minutes before incision. Re-administration at one to two half-lives of the antibiotic is recommended for the duration of the procedure.

Dose selection

A single dose of antibiotic at the therapeutic concentration is sufficient for prophylaxis under most circumstances.

In adults, blood loss of up to 1500ml during surgery or haemodilution up to 15ml/kg does not require an additional dose of prophylactic agent.

In the event of major intraoperative blood loss (>1500ml), additional doses of prophylactic

antibiotic should be given after fluid replacement.

Antibiotic prophylaxis in all cardiac surgeries and interventions is recommended.

If antibiotic prophylaxis is necessary, the recommended medications and dosages are summarized in Table 18.1. Classification of operative wounds and risks of infection are given in Table 18.2.

Table 18.1. Recommended medications and dosages for antibiotic prophylaxis

Situation	Medication	Dosage
Standard prophylaxis	Amoxicillin	Adults: 2.0 g; children: 50mg/kg orally 1h before procedure
Unable to take Oral medication	Ampicillin	Adults: 2.0 g IM or IV; children: 50mg/kg IM or IV Within 30 min before procedure
Allergic to Penicillin	Clindamycin or Cephalexin or Cefadroxil or	Adults: 600mg; children: 20mg/kg orally 1h before procedure Adults: 2.0g; children: 50mg/kg orally 1h before procedure
	Azithromycin or Clarithromycin	Adults: 500mg; children: 15mg/kg orally 1 h before procedure
Allergic to penicillin and unable to take oral medications	Clindamycin or Cefazolin	Adults: 600mg; children: 20mg/kg IV within 30 min before procedure Adults: 1.0g; children: 25mg/kg IM or IV within 30min before procedure

References

1. Antibiotic Prophylaxis in Surgery. A rational clinical guideline. Edinburgh (Scotland): Scottish Intercollegiate Guidelines Network (SIGN); 2000,36p (SIGN publication; no.45).
2. Current guidelines for Antibiotic Prophylaxis of Surgical Wounds. Woods RA, Delling EP. www.aafp.org/lafpi/980600ap/woods.html accessed on July 19, 2004.
3. Antibiotic Prophylaxis Guidelines. American Heart Association, 2004.

POSTOPERATIVE WOUND MANAGEMENT

The occlusive dressing (semipermeable to water vapours and oxygen but impermeable to liquids) consists of a hydrating layer (antibiotic ointments or petroleum jelly), an on-adherent contact layer, an absorbent and cushioning layer (gauze), and a securing layer like hypoallergic tape.

Occlusive dressings should be applied within 2 hours of wounding and left on for at least 24 hours for optimal healing to occur for acute wounds. These should never be used on infected wounds. Dressing changes can be performed once or twice daily. If other types of occlusive are used, the timing of the dressing changes will vary between 1 to 7 days, depending on the wound characteristics.

Postoperative wound infection

Wound infections are classified as:

- Minor: e.g. stitch abscess, cellulitis.
- Major: e.g. presence of discrete collection of pus in wound.
- Superficial infections are limited to skin and subcutaneous tissue.

- Deep infections involve the areas of wound below the fascia.

Postoperative -cross infection inwards. *Staphylococcus aureus* is the most frequently involved organism. Other less common organisms are *Enterococci*, *Pseudomonas*, *Proteus*, *E.Coli* and *Klebsiella*.

Clinical features

- Pain is unusually severe for the magnitude of procedure and last long.
- Fever: 101 to 102°F with tachycardia is usually present.
- Local examination: Wound is warm to touch and maybe swollen and oedematous. Redness of the surrounding area and cellulites is often present.

Wound infections are generally evident between 3rd to 6th postoperative days.

Treatment

Superficial Infections:

1. Drainage: Wounds are managed by opening up the incision to provide adequate drainage.
2. Dressing: Daily dressing with Povidone iodine 5% and a wick is placed to prevent premature closure of the wound.
3. Analgesics: Tab. Ibuprofen 400mg 3 times a day till pain is there.

Deep Infections: Antibiotics are given on the basis of pus culture and sensitivity

In addition to drainage of wound.

Prevention

Postoperative wound infection rate can be minimized by adequate skin preparation, bowel preparation, prophylactic antibiotics, and meticulous surgical technique.

WOUND CARE

Wounds can be classified as acute or chronic and further as arterial, venous, trophic, malignant, etc. (Table 18.3). For the purpose of guidelines, chronic wounds can be defined as an ulcer present at least for 6 weeks.

Treatment

Meticulous wound care includes adequate cleansing, debridement, oedema control, and prevention of ischemia, in addition to maintaining a moist wound environment and keeping the bacteria count as low as possible.

Acute wounds

The overall objectives in caring for wounds that are incompletely clotted are to minimize unnecessary bloodloss and to avoid the formation of a haematoma.

1. Irrigate gently with copious quantities of water or normal saline. Debris and necrotic tissue should be removed without damaging healthy tissue. Sharp mechanical debridement maybe necessary to expose viable tissue for large areas of fibrinous exudates or eschar. Chemical debridement is useful for those areas that are difficult to access by sharp debridement. Chemical debridement of the wounds maybe done using topical agents- antiseptics (chlorhexidine, providone iodine, alcohol, hydrogen peroxide, triclosan) and antibacterials

(silver sulfadiazine, neomycin, polymyxin, bacitracin, mupirocin). When debridement is complete, dressings can be applied.

2. Healing of acute wound is further facilitated by closure. Alternatively, closure can be delayed for several days to allow infection to clear. Wound healing is impaired by malnutrition, oedema, bacterial contamination, is-chemia, smoking and immunosuppressant.

Chronic wounds

Identify and treat the predisposing factors, e.g. diabetes mellitus, peripheral arterial or venous disease, severe anaemia, protein deficiency, rheumatoid arthritis, systemic vasculitis, Cushing's syndrome and conditions requiring systemic steroid therapy.

Table 18.3. Classification and clinical assessment of wounds

Type of ulcer	Clinical assessment	Investigation
Arterial	Involves deep fascia or deeper structure, Decreased or absent distal pulses	Doppler US (ABPI < 0.8)
Venous	Involves skin, subcutaneous fat Tortuous long/short saphenous veins Perforators incompetence	Doppler US/Venography
Tubercular	Undermined edge	Edge biopsy
Trophic	Punched out	
Malignant	Raised/everted margin No evidence of granulation tissue	Edge biopsy

Nonpharmacological

- Encourage daily or twice a day bath, to avoid walking barefoot or with slippers and patient should be encouraged to wear shoes and socks.
- Patients with leg ulcer to reduce standing or excessive walking.
- In leg ulcer due to chronic venous insufficiency or oedema, patients should be advised to wear elastic stockings, elevation of leg and foot end of the bed while asleep along with some leg exercises to activate the calf muscle pump.

Pharmacological

Identify the microorganism and treat accordingly. Tubercular ulcer is treated with antitubercular drug (2HRZE+7HR) for at least 9 months (for details see section on tuberculosis in chapter 1).

Surgical treatment

- Surgical debridement in ulcers associated with necrotic tissue or slough. Clean the wound with physiological normal saline or tapwater only (antiseptics delay wound healing).
- Daily dressing: Gauze adheres to the wound bed and it may remove viable tissue from the wound surface on removal, resulting in delayed wound healing. Some of the commonly used dressings are:
- Occlusive (moisture retentive) dressings (Hydrocolloid gel) in case of clean and shallow ulcers without any pus discharge or other features of infection. Occlusive dressings have

barrier properties that enable to prolong the presence of moisture and wound fluid in the woundbed.

- Calcium alginate dressing: For bleeding wounds and wounds with a cavity.

Refer patients with chronic leg ulcer to a vascular surgeon or general surgeon with some experience in peripheral vascular problems for surgical treatment.

Reference

1. Incisions,Closures and Management of Wound.In: Maingot's Abdominal Operators.10th Edition, 1997, Prentice Hall International, pp 395-426.

VARICOSE VEINS

Varicose veins are the most common complaint, which extends through increasing degrees of venous insufficiency and may result in leg ulceration in the most severe cases.

Basle Study Venous Classification

No venous disease.

Varicosities:

- (i) Telangiectasial hyphen webs(spider veins): intradermal varicose veins those are small and rarely symptomatic.
- (ii) Reticular veins:subcutaneousveins that begin at the tributaries of the trunk veins.
- (iii) Trunk veins:varicose veins of the greater/lesser saphenous system and its named tributaries.

Chronic venous insufficiency:

- (i) Dilated subcutaneous veins.
- (ii) Hyperpigmented/depigmented areas.
- (i) Open/healed ulcer.

Diagnosis

- Varicose veins refer to any dilated, tortuous, elongated vein, regardless of size.
- Duplex ultrasonography is confirmatory and also helps in localization of perforators and at times saphenopopliteal opening which is of immense help in the performance of operation.
- Evaluation of the deep venous system is a must in a patient with a history or clinical examination suggestive of deep venous thrombosis (leg oedema, present or past ulcer).

Treatment

Carefully examine the lower limb for sapheno-femoral reflux, varices and perforators in thigh and manifestations of venous insufficiency in calf and foot. Reassurance and use of elastic compression stockings,

Definitive treatment includes injection sclerotherapy or surgical treatment.

Surgical

A recent episode of deep venous thrombosis is an absolute contraindication for operation in the superficial venous system.In cases of Long saphenofemoral incompetence, saphenofemoral flush ligation along with stripping upto thigh is done with careful attention to groin tributaries and if there is incompetent perforators in leg ,perforator ligation should be added.Saphenofemoral ligation alone can be

performed under local anaesthesia but the addition of stripping or operation of the sapheno-popliteal system warrants spinal/general anaesthesia.

In case of small varices and those where the main long and short saphenous veins and their major tributaries, are competent, injection sclerotherapy with STD (sodiumtetradecyl sulphate) is best used in the management of large varicose veins and perforators in the calf. Treatment can be repeated when necessary.

Technique: Place 25 G needle into the varices or perforators. Empty the vein and inject 0.5 ml of sclerosant i.e. STD. Compression is applied immediately with compression bandage or stocking.

Or

Ambulatory phlebectomy (avulsion of veins) prevents venous recanalization and recurrence.

Endoscopic subfascial ligation can be done in tertiary centers.

RF Ablation , Laser ablation can be performed at tertiary centres.

Postoperative management

1. Compression bandaging immediately following stripping or avulsion of veins.
Replace bandages by compression stocking after 2 days.
2. Limb elevation and encourage the patient to walk with compression stockings after first change of dressing 48 hours after operation.
3. Postoperative pain is controlled with dextropropoxyphene or NSAIDs.

Reference

1. Venous Disorders.IN: Bailey and Love's Short Practice of Surgery, Russel RCG,Williams NS, Bulstrode C J K. (eds), 24th Edition, 2004, Arnold London, pp956-967.

CERVICAL LYMPHADENOPATHY

Cervical lymphnodes may become enlarged as a result of inflammation or neoplastic process (Table18.4). Tuberculosis is one of the commonest cause of cervical lymphadenopathy.

Table 18.4.Causes of lymphadenopathy and clinical features

Condition	Causes	Clinical features
Acute inflammation	Infection of the aerodigestive tract,head and neck or other infections	Fever, sore throat,firm,tender nodes 1-2 cm in diameter
Chronic inflammation	Tuberculosis,sarcoidosis, Histiocytosis X	Swelling in the neck and fever, cough may or may not be present Variable on presentation depending on the stage of the disease: multiple matted lymphnodes/cold abscess
Lymphomas	Hodgkins/NonHodgkins lymphoma	Large painless rubbery lymphnodes.
Metastatic	Carcinomas of the upper aerodigestive tract,skin tumours of the head and neck:squamous cell carcinoma, basal cell carcinoma, melanoma. Enlargement	Symptoms related to primary disease,

Treatment

Detailed history and examination are essential to pinpoint specific aetiology. Majority of the lymphnodes are reactive to viral infections of upper respiratory tract, therefore,do not require any treatment.

- A. In case of acute suppurative lymphadenopathy secondary to any focus of bacterial infection in the drainage area:

Cap.Cephalexin 250-500 mg every 6 hours for 7 days.

Or

Cap. Amoxicillin 250-500 mg every 8 hours for 7 days.

If lymph nodes persist, perform fine needle aspiration cytology (FNAC) and treat accordingly. If FNAC is nonconclusive take a biopsy from the enlarged lymphnode and treat accordingly.

- B. In case of chronic lymphadenopathy perform FNAC and treat accordingly.

If FNAC is nonconclusive, perform biopsy and treat accordingly.

Treatment (tubercular lymphadenopathy)

Start antitubercular therapy(see section on tuberculosis in chapter 1).

Reassess the patient after 6 months. If lymphnodes are either not present or less than 1cm size keep the patient under follow-up and continue treatment.However, if lymphnodes are palpable and more than 1cm take a biopsy of the node and treat accordingly and consider second line antitubercular drugs.

Reference

1. The Neck. In: The NewAird's Companion in Surgical Studies, Bumand KG,Young AE,2nd Edition , 1998,Churchill Liv ingstone,London pp 451-455.

THYROID SWELLING

The differential diagnoses of thyroid swelling are

- Benign goiter,
- Intrathyroid cysts,
- Thyroiditis,
- Benign and malignant tumours.

Clinical Features

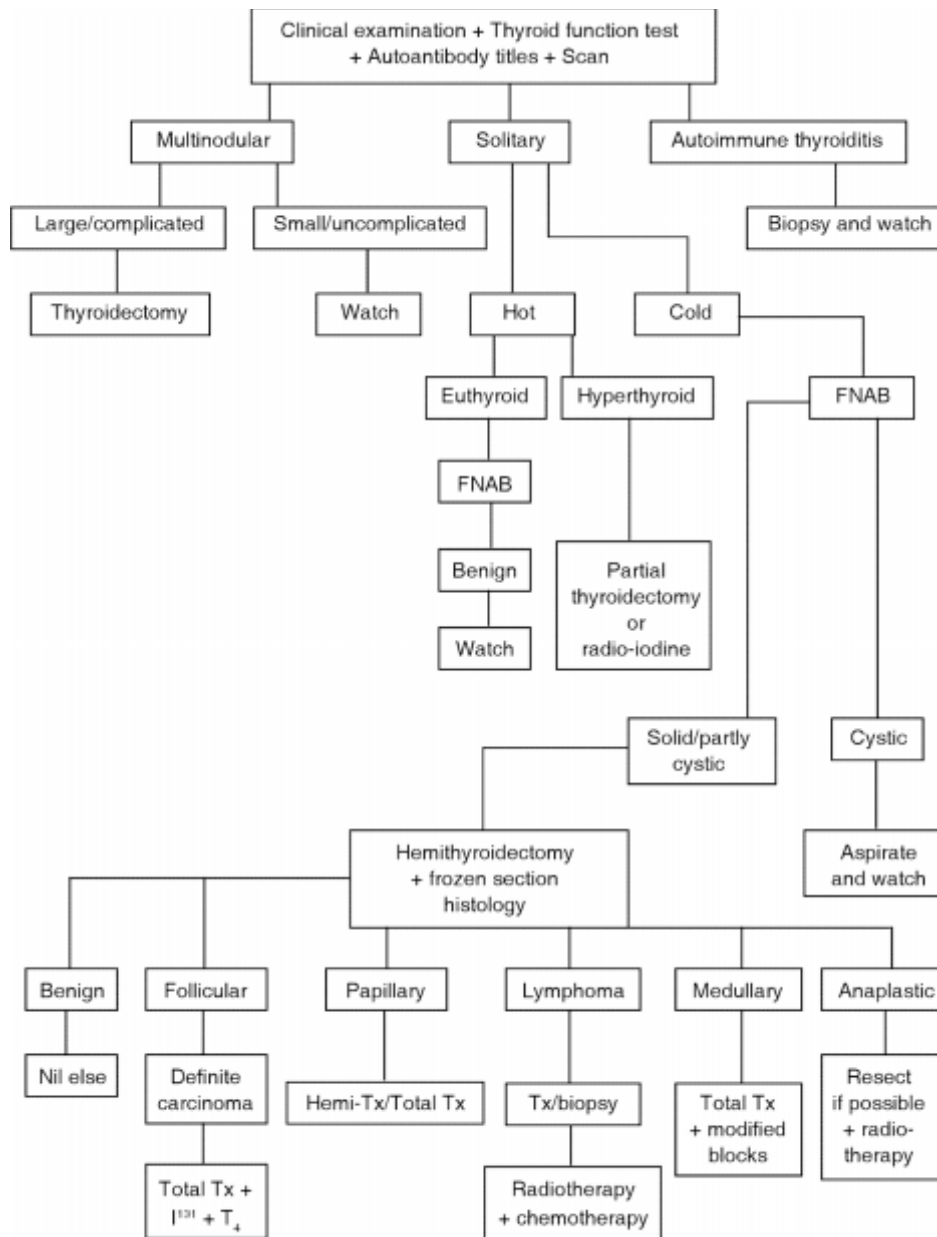
- Simple goitre– iodine deficiency.
- Malignancy-extremes of age, male sex, rapidly growing swelling, persisting pain, dysphagia, recurrent laryngeal nerve palsy, hardness and fixity of the thyroid gland and presence of one or more palpable neck nodes.

Investigations

- Fine needle aspiration cytology,
- Isotope scan
- Ultrasonography

Treatment

Simple diffuse hyperplastic goiter is preventable by using iodized salt. Treatment with L-thyroxine can reverse the swelling at the stage. Simple nodular goitre is treated by thyroidectomy depending upon the lobes involved.(Fig.18.1).



(Tx—thyroidectomy, T₄—Suppressive thyroxine therapy, FNAB—Fine needle aspiration biopsy)

Fig. 18.1. Management plan for thyroid nodule.

Thyroidectomy

Preoperative care. Preoperative antibiotic prophylaxis (Inj. Ampicillin 1g IV

30 min before operation) is given to the patient. Prior to thyroidectomy, indirect laryngoscopy (IDL) is performed to identify compensated or unsuspected recurrent laryngeal nerve palsy. Before operation, thyrotoxic patients should be made euthyroid with antithyroid drugs (carbimazole 10-15mg 4 times a day and propranolol 20mg 3 times a day). And lugols iodine can be added. Fully discuss the potential complications with the patients -mentioning the risk to parathyroid gland and recurrent laryngeal nerve.

Postoperative care. Place patient in a slightly propped up position. Carefully observe for respiratory insufficiency, haemorrhage from the wound, irritability to the facial nerve and carpopedal spasm (parathyroid injury). Monitor drain output daily and remove if 24 hours output becomes lesser than 10 ml. Check wound site for infection and suture removed on the 5th day.

Complications.

- Haemorrhage under deep cervical fascia, which can lead to acute asphyxia. Management include reopening of the suture line, to drainage of the haematoma and re-exploration for control of bleeders.
- Damage to recurrent laryngeal nerve can lead to respiratory distress (bilateral recurrent laryngeal nerve) and hoarseness of voice.
- Parathyroid damage leads to hypocalcaemia. Symptomatic hypocalcaemia (positive Chvostek's or Trousseau's signs or corrected serum calcium level <8 g/dl) is treated with 10% calcium gluconate intravenously. If hypocalcaemia persists, oral calcium supplement and synthetic Vitamin D is necessary.
- Late complications include recurrent thyrotoxicosis (Grave's disease), hypothyroidism, and recurrence of malignancy at the local site or in the lymphnodes in the neck.

Radio-iodine therapy

Radio-iodine therapy is indicated in follicular, papillary and mixed carcinoma. Following total thyroidectomy; a total body radioactive isotope scan should be arranged four weeks after the operation. During this period L-thyroxine therapy should be withheld. If radioactive scan shows residual thyroid tissue or metastatic deposit then further dose of radioiodine should be given to ablate these. Following isotope scan, highdose L-thyroxin (0.2-0.3mg) should be started and continued for life. Radioactive iodine has no role in residual/metastatic medullary carcinoma. Treatment approach to Hurthle cell neoplasm is similar to follicular neoplasm.

Followup

Patients should be followed at three monthly intervals for the initial 2 years and

6 monthly for next three years and then at yearly interval for life. On each follow up visit patient should be examined for any local or nodal recurrence in the neck, a chest X-ray should be done to exclude pulmonary deposit and clinical features of thyroid toxicity noted and dose of L-thyroxine regulated.

Reference

1. The Thyroid Gland. In: The New Aird's Companion in Surgical Studies. Burnand KG, Young AE (eds), 2nd Edition, 1998, Churchill Livingstone, London pp459-485.

BREAST ABSCESS

Breast abscesses can be classified into mastitis neonatorum, lactating epidemic or sporadic mastitis, and non-lactating breast abscesses.

Usually caused by highly virulent strains of penicillin resistant *Staphylococcus aureus* and anaerobic *Streptococci*.

Treatment

Nonpharmacological

Rest and support to the breast and to continue breast feeding from both the breasts, however, in case of larger abscess shift to bottle feeding.

Pharmacological

In early stage (induration only):

1. Tab Amoxyclav 625 mg 3 times a day for 7 days
2. Tab.Erythromycin 500mg 3 times a day for 7 days.

Or

Tab Roxithromycin 150mg twice a day.

3. Tab.Metronidazole 400mg 3 times a day for 7 days.
4. Tab.Ibuprofen 400mg as and when required. In case of no improvement or large abscess:
 1. Antibiotics as above.
 2. Incision and drainage of pus through thinned skin over the abscess (Large abscesses require operation under intercostal block or general anaesthesia).
 3. Daily dressing.

In some cases suppress lactation with hormones if the mother finds breast feeding too painful.

Reference

1. Abscesses in Special Sites. In: Hamilton Bailey's Emergency Surgery, Ellis B W, Paterson-Brown S.(eds), 13th Edition, 2000,Arnold,London, pp165-166.

DYSPHAGIA

Dysphagia is the sensation of difficulty in swallowing. It maybe due to general causes e.g. myasthenia gravis, bulbar palsy, hysteria etc. or due to the local causes. The latter maybe

- a. Intraluminal (e.g.foreign body)
- b. Intramural (e.g. achalasia, oesophagitis, oesophageal strictures, Plummer- Vinson syndrome, pharyngeal pouch,benign neoplasm,malignant neoplasm)
- c. Extra luminal (e.g. retrosternal goitre, mediastinal tumor, mediastinal lymphadenopathy, aortic aneurysm, hiatus hernia).

Clinical Features

Difficulty in swallowing (solids and/or liquids),oesophageal pain,regurgitation and aspiration.

Investigations

- Barium swallow to evaluate cause, site and extent of the lesion and the state of the oesophagus above and below the lesion;
- Upper GI endoscopy for direct vision evaluation and for taking tissue for histopathological examination wherever indicated.
- Abdominal ultrasound, chest X-ray and other routine investigations.
- CT scan and endoscopy ultrasound to be considered in tertiary care centers, wherever indicated;
- Oesophageal manometry, pH studies and evaluation for *H pylori* to be considered in tertiary care centers, wherever indicated.

Treatment

Definitive treatment depends on the cause and its extent.

Nonpharmacological

Diet restricted to liquids or semisolids depending upon extent of dysphagia. Psychotherapy if the patient is depressed or demoralized.

Pharmacological

Gel Magnesium hydroxide+Aluminium hydroxide+Activated Dimethicone (250 mg+250mg+50mg/ml) 20ml 6 hourly,

Or

Tab.Ranitidine 150mg 2 times a day.

Or PPI

Reference

1. Dysphagia. In:Harrison's Principles of Internal Medicine.Kasper DL, Braunwald E, Fauci A S et al (eds), 16th Edition, 2005,McGrawHill Company Inc.,NewYork, pp217-219.

ACUTE ABDOMEN

Abdominal pain can occur due to variety of medical and surgical causes.

Causes of acute abdomen

Abdominal causes

1. Inflammation of peritoneum due to bacterial or chemical contamination, perforation of appendix or bowel, ulcer, pancreatitis or pelvic inflammatory disease.
2. Mechanical obstruction of hollow viscera-intestinal obstruction, ureteric obstruction due to stone or other causes, and obstruction of the biliary tree.
3. Vascular disturbances -vascular rupture, embolism orthrombosis, torsion of pedicle.

Treatment

1. In cases of peptic or bowel perforation exploration and repair of the perforation should be done after proper resuscitation and in sepsis and contaminated abdomen exteriorization of bowel in form of ileostomy should be performed.

2. Pancreatitis should be dealt conservatively with higher antibiotics and I/V fluids.
3. In acute cholecystitis emergency Laparoscopic cholecystectomy can be performed or can be managed conservatively..Definitive treatment is Laparoscopic / Open cholecystectomy in symptomatic and asymptomatic patients with diabetes or a solitary large stone or multiple small stones with wide cystic duct or porcelain gall bladder .

But in cases of Gall bladder perforation / Empyema /gangrenous cholecystitis emergency surgery should be undertaken.

4. Maintenance IV fluids (for details see section on fluid and electrolyte imbalance in adults in chapter 1 and children in Chapter 19).
 - a. Inj.Ciprofloxacin (infusion 100mg/50ml) 100ml IV twice a day.
 - b. Inj.Gentamicin (40mg/ml) 2ml IV 8 hourly.

Or

- a. Inj.Ampicillin (500mg/ml) 1ml IV 6 hourly.
- b. Inj.Cloxacillin (500mg/ml) 1ml IV 6 hourly.

Or

- a. Inj.Ciprofloxacin (infusion (100mg/50 ml) 100ml IV twice a day.
- b. Inj.Amikacin (500mg/2ml) 2ml twice a day.
2. In case anaerobic bacterial infection is suspected or anticipated, give Inj.Metronidazole (500mg/100 ml)100ml IV 8 hourly.
3. Inj. Diclofenac sodium (25mg/ml)2-3ml IM SOS or 6 hourly.

Or

- Inj. Pentazocine lactate (30mg/ml) 1ml IM SOS.
4. Inj.Hyoscine butylbromide (20mg/ml) 1ml IV SOS.
5. In patients having obstructive jaundice, add Inj.Vitamin K(10mg/ml) 1ml IM once or twice a day till prothrombin time reaches to a satisfactory level.

Antibiotics are usually stopped after 5-7 days unless the patient has evidence of persistent infection or has indwelling tube(e.g.,T-tube),

Reference

1. Cholelithiasis and Cholecystectomy. In:Maingot's Abdominal Operations, Zinner M I, Schwartz S I, Ellis H (eds), 10th Edition, 1997,Prentice Hall International, pp1717-1738.

APPENDICITIS

Appendicitis is the commonest cause of acute abdomen and may appear as catarrhal appendicitis or as obstructive appendicitis and sometimes it may present as an appendicular lump or appendicular abscess or as burst appendix with peritonitis.

Clinical Features

- Acute central abdominal pain, followed by nausea, vomiting and fever,with the pain after a variable period, shifting to right lower abdomen localized tenderness maximum at the

- Mc Burney's point, rebound tenderness and guarding in the right iliac fossa,
- An inflammatory lump in the right lower abdomen or signs of peritonitis.
- A polymorphonuclear leucocytosis and ultrasonographic appearances may help to corroborate the clinical diagnosis.
- Investigations are primarily undertaken to exclude other conditions like ectopic gestation or ureteric calculus.

Treatment

The definitive treatment is appendicectomy either Laparoscopic or Open and the sooner it is done, the better. An interval appendicectomy should be performed where a lump has formed or when attack has already resolved or circumstances make surgery not feasible.

Nonpharmacological

Stop oral feeding.

Pharmacological (expectant management)

1. Intravenous fluids to maintain hydration. Requirement of fluids would be more if the patient has peritonitis and septicaemia.
2. Inj. Ciprofloxacin infusion (100mg/50 ml) 100ml twice a day for 5 days.
3. Inj. Gentamicin (40mg/ml), 80mg IV 8 hourly.

Or

- Inj. Amikacin (500mg/2ml), 2ml IV twice a day.
4. Inj. Metronidazole infusion (500mg/100 ml) 100ml IV 8 hourly.
5. Inj. Diclofenac sodium (25mg/ml) 50ml IM SOS.

(Caution: Purgation and enema are contraindicated)

Postoperative management

Oral feeding is started when abdomen is soft, the patient has passed flatus/ stools and bowel sounds have appeared. Start with liquids, gradually permitting semisolid and solid diet over a period of 2-3 days.

Antibiotics should continue for 5 days or more if the condition demands.

Initially antibiotics are given by parenteral route and later switched to oral route when the patient starts tolerating semisolid diet.

Patient is discharged usually between 3rd and 5th postoperative day, if comfortable, ambulatory, tolerating semisolid or solid food, afebrile and has a healthy wound.

Sutures are removed around 7th postoperative day.

Reference

1. Appendix and Appendicectomy. In: Maingot's Abdominal Operations, Zinner M J, Schwartz sr, EllisH (eds), 10th Edition, 1997, Prentice Hall International, pp1191-1228.

RETENTION OF URINE

Retention of urine is inability to pass urine. It can be either acute or chronic.

<i>Mechanical</i> causes	<i>Neurogenic</i> causes
Posterior urethral valves, Foreign bodies, Tumours, Blood clot and stones, Phimosis, Paraphimosis, Trauma (rupture of urethra or bladder), Urethral stricture, Urethritis, Meatal ulcer, Tumours, Prostatic enlargement- benign or malignant, Retroverted gravid uterus, Fibroid, Ovarian cyst, Faecal impaction.	Postoperative retention, Neurogenic bladder, Spinal cord injuries, hysteria, Drugs-anticholinergics, antihistaminics, smooth muscle relaxants.

Clinical Features

- Acute retention of urine is characterized by inability to pass urine despite urge, suprapubic discomfort or severe agonizing pain. There may be previous such episodes or history of trauma, instrumentation or surgery.
- Chronic retention is an enlarged painless bladder whether or not the patient is having difficulty with micturition. Sometimes acute episode can be precipitated in cases of chronic retention of urine.
- There may be symptoms suggestive of prostatic enlargement in elderly male.
- On examination, there is suprapubic swelling arising out of pelvis in the midline in the hypogastric region that is dull to percussion and cystic in nature. This helps to differentiate from anuria where urinary bladder is not palpable.
- Rectal examination will help to confirm the prostatic pathology in elderly patients.
- Spinal defects or neurological findings suggest presence of neurogenic bladder.

Treatment

1. If there is no history of trauma, and urethral injury is ruled out catheterization should be attempted under strict aseptic precautions.
2. If urethral pathology is present or there is inability to pass the catheter, a suprapubic puncture or cystostomy is performed to relieve the retention.
3. In case of chronic retention, decompression should be performed intermittently (300-400 ml volume) to avoid haematuria that can occur after sudden decompression.
4. The patient should be kept under observation after admission for investigation to elucidate the cause of retention. The investigations include urine examination, renal functions, plain and contrast radiological studies; ultrasound, CT scan or MRI. Urodynamic studies are

required to diagnose neurogenic bladder. Cystoscopy can help to diagnose and treat many conditions of the urethra and urinary bladder.

5. Definitive treatment of the aetiology is done after proper investigations.

Pharmacological

1. Ofloxacin 400mg once a day for 7 days
2. Tab.Cotrimoxazole (960mg) 2 times a day

Or

Tab.Norfloxacin 400mg 2 times a day for 5-7 days.This may be changed according to urine culture and sensitivity reports.

Reference

1. The Urinary Bladder.In: Bailey and Love's Short Practice of Surgery, Russel R C G ,Williams NS, Bulstrode CJK (eds), 24th Edition, 2004, Arnold, London, pp1334-1369.

INGUINAL HERNIA

Hernia occurs due to raised intra-abdominal pressure due to various causes or weakness of the body wall due to any disease. Most common type of the external hernia is the inguinal hernia, less common being femoral and umbilical.

Clinical features

Pain and swelling in the groin. The swelling increases as the duration of hernia increases.

Complications of hernia include irreducibility, incarceration and obstruction, strangulation and inflammation due to inflammation of the contents.

Treatment

Surgical treatment

The treatment of choice for hernia is surgical repair. The surgery is advocated as soon as the diagnosis is made since the complications are common. Even in children, hernia repair is done at the earliest after diagnosis. Any predisposing factors need to be treated first before hernia repair else recurrence is possible.The hernia with complications needs to be operated in emergency.

Treatment in children entails herniotomy while in adults repair of the posterior

wall of the inguinal canal without (herniorrhaphy) or with prosthesis (hernioplasty) after high ligation and division of the sac is done.This can be done by open repair or laparoscopic repair by the experts. Daycare surgery under local anaesthesia is practiced at many centers.

Complications of herniorrhaphy include infection, haematoma formation, injury to viscera like urinary bladder, injury to vas and recurrence.

Nonsurgical treatment

This is not advocated for the treatment of hernia except in the extremely frail patients unfit for surgery or where surgery is refused by the patient. Application of external pressure causes trauma to skin and may cause injury to the contents.

Reference

1. J. Hernias. In: Maingot's Abdominal Operations, Zinner MJ, Schwartz SI, Ellis H (eds), 10th Edition, 1997, Prentice Hall International, pp 497-580.

SCROTAL SWELLINGS

Scrotal swellings can be either congenital or acquired. The acquired scrotal swellings could be further classified as inflammatory, traumatic or malignant. Important diagnoses include hydrocoele, epididymo-orchitis, torsion of testis and tumours.

A. Hydrocoele

This is a collection of fluid in some part of processus vaginalis usually tunica. Hydrocoele could be primary or secondary to testicular diseases like inflammation, infections or malignancy.

Clinical features

- Cystic swelling usually translucent, it is possible to reach above the swelling and it is not possible to feel the testis distinct from the swelling.
- Although there is history of reduction of size in children, it is not reducible.
- Complications include rupture, haematocoele formation, infection (pyocoele), calcification and testicular atrophy and herniation through the dartos muscle in longstanding cases.

Treatment

In infants, it is advised to wait till the age of two years to allow spontaneous resolution. Beyond the age of two years, the surgical treatment entails herniotomy by the inguinal approach.

In adults, definitive treatment requires drainage of the fluid along with eversion of the sac with or without excision of the same. This can be done under local or regional anaesthesia.

B. Epididymo-Orchitis

Epididymo-orchitis is inflammation of the epididymis and the testis due to various causes. It can be acute or chronic. Infection reaches the epididymis via the vas deferens from the lower urinary tract. A history of urinary tract infection is usually available. The condition has to be differentiated from torsion of testis (as given below).

Clinical Features

- The epididymis and the testis show swelling with shiny oedematous skin and tenderness.
- It may be possible to feel the epididymis and testis separately.
- The pain is relieved by rest and elevation of testis.
- Urine examination shows pus cells.
- Complications include secondary hydrocoele with clear fluid, abscess formation and pus discharge from sinus formation.

Treatment

Bed rest and scrotal support.

Pharmacological

1. Ofloxacin 200 mg twice a day for 7 to 14 days

2. Cap. Doxycycline 100mg twice daily for 8- 10 days. It may be changed according to urine culture and sensitivity.
3. Analgesic and antipyretics may be required.

c. Torsion of Testis

Torsion of testis is most common between ages of 10-25 years though it may occur at any age.

Clinical features

- Sudden onset of pain in the affected testis and lower abdomen.
- Testis is tender; lies higher as compared to its counterpart;
- Opposite testis lies horizontally; it isn't possible to palpate testis and epididymis separately;
- Pain increases on elevation of testis and secondary haemorrhagic hydrocoele.
- Ultrasound examination and colour Doppler examination demonstrate torsion of testis and resultant obstruction of the blood supply.

Treatment (Immediately refer to a higher centre)

Treatment of torsion of testis requires immediate correction by surgical exploration through scrotal incision, untwisting of the cord and orchiopexy.

It is important to fix the opposite testis at the same time. It is of paramount importance NOT to delay the exploration even if diagnosis is doubtful or for the want of special investigations. Any undue delay can lead to gangrene of the testis.

Reference

1. Disorders of the Testis, Scrotum and Spermatic Cord. In: Smith's General Urology, Tanagho EA, McAninch JW (eds), 15th Edition, 2000, McGraw Hill Company Inc., New York, pp 684-693.

FISSURE-IN-ANO

An anal fissure is an elongated ulcer in relation to anal canal. It most commonly occurs in the midline posteriorly. Most cases are idiopathic and maybe due to trauma and ischaemia. Specific causes of fissure are

- Chronic constipation
- inflammatory bowel disease
- sexually transmitted diseases.

Clinical features

- Severe pain on defaecation that promotes constipation.
- Bleeding is usually small and occurs as a streak by the side of stools.
- A foul smelling discharge is present in chronic cases.
- On examination, a longitudinal ulcer is seen in the midline posteriorly that maybe covered by a skin tag. There is local inflammation and induration.

Treatment

The aim of the treatment is to obtain complete relaxation of the sphincter and provide relief from pain.

Nonpharmacological

- Sitz bath- sitting in a tub containing lukewarm water with potassium permanganate to provide relief from spasm and pain.
- Local hygiene.
- High fiber diet to prevent constipation.

Nonsurgical

2% Glycerine trinitrate as an ointment for local application.

Surgical

Manual dilatation of the anal sphincters - Lord's procedure.

Lateral anal sphincterotomy.

Dorsal fissurectomy and sphincterotomy.

Complication of surgical treatment could include mild incontinence and prolonged healing time.

FISTULA-IN-ANO

Fistula-in-ano is a tract lined by granulation that connects superficially the skin around the anus and deeply the anal canal or the rectum. Low level fistula opens into the anal canal below the anorectal ring. The high level fistula opens into the canal at or above the anorectal ring.

Clinical Features

- Persistent seropurulent discharge that may be blood stained:
- Pain and sometimes a history of a perianal abscess that has been drained.
- Fistula-in-ano may be associated with tuberculosis, Crohn's disease, carcinoma, bilharziasis.
- There is usually an opening within 3-4 cm of the anal orifice with granulation tissue. The fistula heals only to recur later on. Digital examination may reveal the internal opening.

Treatment

Nonpharmacological

Local hygiene and sitz bath. Diet modification to avoid constipation.

Pharmacological

1. Cap. Ampicillin 500mg every 6 hours.
2. Tab. Metronidazole 400mg every 8 hours.
3. Bulk laxative to relieve and avoid constipation.

Definitive treatment is fistulotomy (laying open of the fistula tract), fistulectomy (excision of the fistula tract) and use of Seton. Secondary fistula needs treatment of primary disease. High level fistula may need proximal colostomy for treatment.

Reference

1. Benign Diseases of the Anorectum. In: Maingot's Abdominal Operations, Zinner M J, Schwartz S I, Ellis H (eds), 10th Edition, 1997, Prentice Hall International. London, pp.1437-1454.

HAEMORRHOIDS

Haemorrhoids (commonly called piles) are the dilated tortuous veins occurring in relation to the anus. These can be

- A. Primary
- B. Secondary to
 - Carcinoma of rectum,
 - Pregnancy,
 - Straining at micturition
 - Constipation

These can be classified into depending on their position in relation to anal orifice.

- External,
- Internal
- Mixed (externo-internal)

Clinical Features

- Many small sized haemorrhoids are asymptomatic
- Painless bleeding (bright red) that can be mild or severe.
- Mucous discharge, prolapse of piles and occasionally pain due to proctitis
- Chronic cases develop anaemia due to continuous blood loss.

On the basis of clinical features, haemorrhoids can be graded:

- First degree—bleed only, do not prolapsed
- Second degree—bleeding occurs, descend down on straining but reduce spontaneously
- Third degree—piles prolapse during defaecation, but stay prolapsed and have to reposed manually
- Fourth degree—piles are large and remain permanently prolapsed

On examination, there is no external evidence of haemorrhoids in early cases. In advanced cases, haemorrhoids can be seen on straining or are constantly prolapsed.

Complications of haemorrhoids include strangulation, thrombosis, ulceration, gangrene, fibrosis, suppuration and pylophlebitis.

Treatment

Asymptomatic haemorrhoids do not need any treatment. Secondary haemorrhoids due to concomitant disease also tend to resolve once the underlying disease is cured.

In asymptomatic or mild degree haemorrhoids

Bowel regulation by the use of laxatives, use of high fiber diet, Sitz bath and application of topical

ointment containing Xylocaine (2%) to relieve pain, if any.

In case bleeding persists despite these measures, second and early third degree piles

Tab Texakind 500 mg twice a day, Cap Calcium Dobesilate twice a day or Tab Diosmin + hesperidin, Injection treatment using 5% phenol in almond oil (3-5ml for each pile) / rubber band ligation / photocoagulation cryosurgery / infrared or laser coagulation.

Late third and fourth degree piles

Haemorrhoidectomy or PPH Stapler Haemorrhoidectomy. The complications of surgery include pain, acute retention of urine, reactive bleeding and later on secondary haemorrhage and anal stricture.

Reference

1. Benign Diseases of the Anorectum. In: Maingot's Abdominal Operations. Zinner M J, Schwatz SI, Ellis H (eds), 10th Edition, 1997, Prentice Hall International, pp1437-1444.

PAEDIATRIC SURGICAL CONDITIONS

Spina Bifida

Spina bifida is a congenital malformation in which there is incomplete closure of the spinal arch at one or more levels.

Clinical Features

- Spina bifida occulta—defect is seen only on the radiographs. Some sort of cutaneous manifestation may point towards the underlying defect.
- Spina bifida aperta—meningocoele, meningo-myelocoele and syringomyelocoele. The lesions have varying degree of associated neurological deficit, musculoskeletal defects. Almost 90% cases have associated hydrocephalus.

Treatment

If the lesion is detected on antenatal ultrasound, parent counseling should be done after investigations for other associated congenital malformations. If the parents opt for continuation of pregnancy, they should be referred to a center where facilities of paediatric surgeons or neurosurgeon are available. If a newborn baby is seen with a defect on the back, baby should be taken for immediate surgery after relevant investigation at a center where expert surgical expertise and operating facilities for neonatal surgery are available.

At the peripheral center management would include:

- Isolation of the newborn and prevention of hypothermia.
- Care of the lesion and back to prevent desiccation and trauma.
- Nursing in a prone position.
- Intravenous fluids- 10% Dextrose 60ml/kg/day for the first 48 hours of life.
- Inj. Ampicillin (500mg/vial) 100mg/kg in 4 divided doses.
- Transfer the baby to a tertiary care center.

Reference

1. Management of Spina Bifida, Hydrocephalus, Central Nervous System Infections and Intractable

UNDESCENDED TESTIS

Undescended testis is defined as the testis, which cannot be brought to the base of the scrotum without undue tension on the spermatic cord.

Clinical features

- The testis can be located in the superficial inguinal pouch, inguinal canal or intra-abdominal site. Truly ectopic testis can be present in perineum, femoral region, pubopenile site or contralateral hemiscrotum.
- Differentiate from retractile testis which is occasionally pulled up due to reflex contraction of cremasteric muscle. The retractile testis is normal in size, can be brought down into scrotum where it stays for sometime and the scrotum is normally developed.

Complications of undescended testis include temperature effects on testis, endocrine effects, germ cell alteration, lower fertility, higher incidence of malignancy, increased incidence of torsion, increased chances of trauma and psychological trauma.

Treatment

1. If the newborn child is seen with unilateral undescended testis, follow up the patient at intervals to see the descent. If testis fails to descend by the age of 12 months, orchiopexy is advised. If seen after first birthday the operation of orchiopexy should be done before the age of two years. The operation entails mobilizing the testis and cord structures and fixing it in the subdartos pouch in the scrotum with unabsorbable sutures.
2. If the newborn child has bilateral undescended testes with hypospadias, it should be investigated for intersex disorder.
3. If a child has undescended testis with clinically visible hernia, orchiopexy can be done at an earlier age along with herniotomy.

Reference

1. Undescended Testis, Torsion and Varicocele. In: Paediatric Surgery, O'Neill JA Jr, Rowe MI, Grosfeld JL et al (eds), 5th Edition, 1998, Mosby, St. Louis.

ANORECTAL MALFORMATIONS

These are characterized by the absence of the anal opening or an abnormally located anal or rectal opening. These can be associated with other congenital malformations like cardiac anomalies, gastrointestinal anomalies, vertebral anomalies, genitourinary system anomalies and limb anomalies.

Treatment

- Isolate the baby, Maintain temperature,
- Insert nasogastric tube to rule out oesophageal atresia and decompress stomach,
- Reassure and counsel parents. Explain prognosis.

Pharmacological

It is required in all the cases that are to be undertaken for surgery in the form of definitive procedure or preliminary colostomy.

1. Intravenous fluids 10% Dextrose 60ml/kg per day (first 48 hours) and Isolyte P 100ml/kg body weight thereafter till required.
2. Inj. Vitamin K 1mg IM stat
3. Inj. Ampicillin 50-100mg/kg in 4 divided doses for 7 days.
4. Inj. Metronidazole 7.5mg/kg per day in 3 divided doses for 3 days.

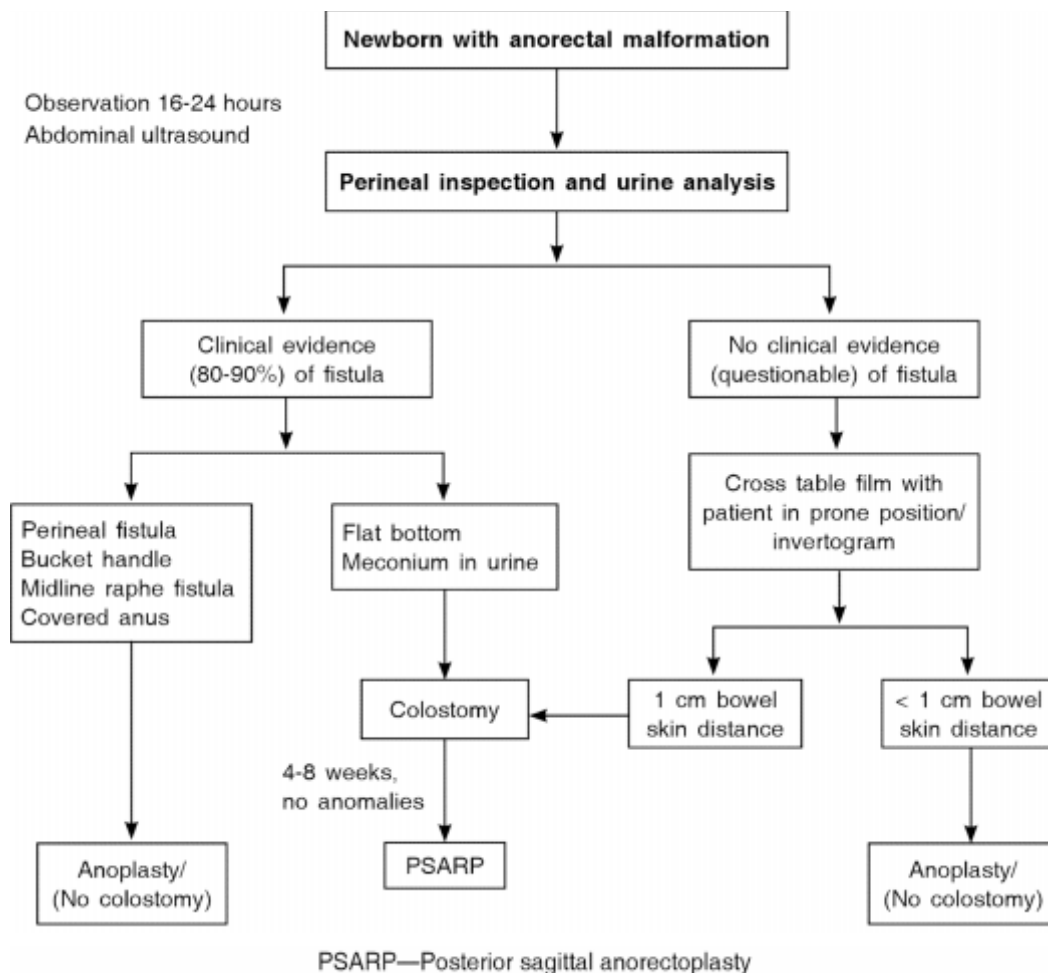


Fig. 18.2. Examination and management of anorectal anomalies in male.

Surgical treatment

Best carried out by a qualified paediatric surgeon.

Figure 18.2 and 18.3 depict examination and management of anorectal anomalies in male and

female newborns. Transfer newborns to such centers for performing the definitive surgery. However, colostomy can be performed at places where expertise for doing definitive procedure is not available.

Anovestibular fistula can be managed by cutback procedure at a peripheral center as initial procedure. Anal stenosis can be managed by anal dilatation.

If unsure, it is safe to perform a sigmoid colostomy before referring the patient to a tertiary care center.

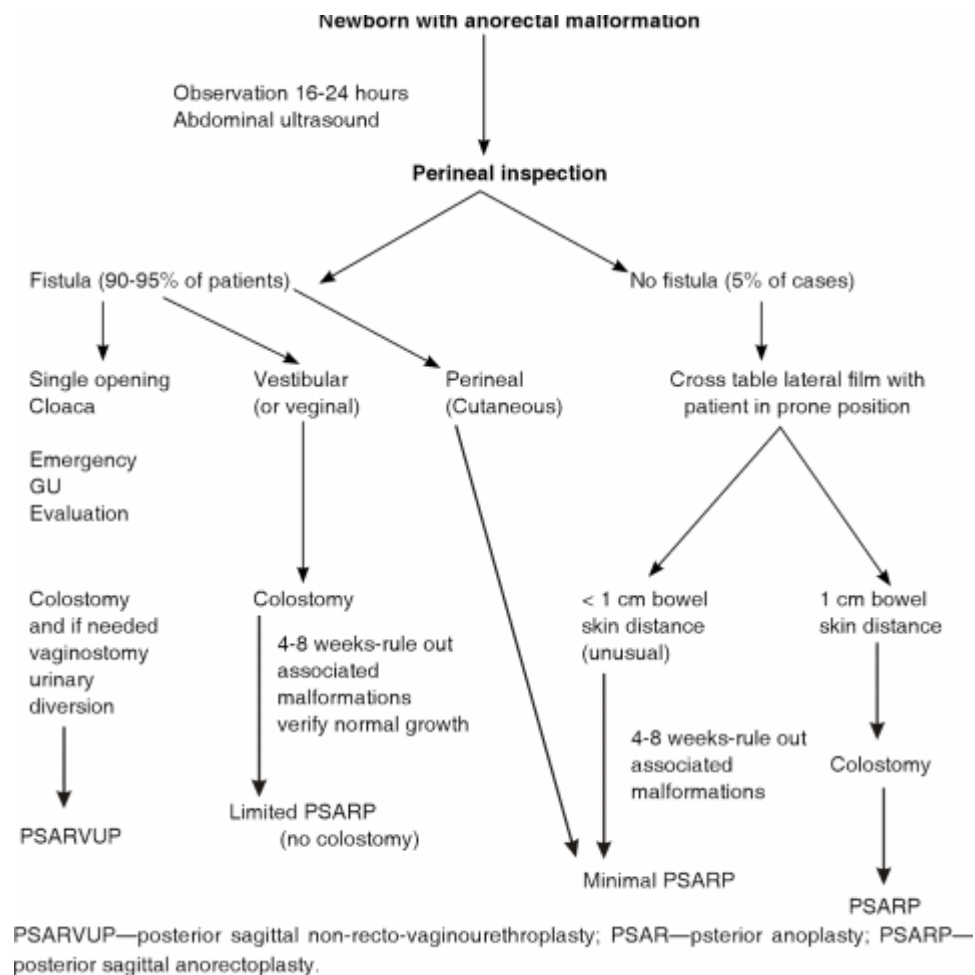


Fig. 18.3. Examination and management of anorectal malformations in female.

Reference

1. Anorectal Malformations. In: Paediatric Surgery. O'Neill JAJr., Rowe MI, Grosfeld J Letal (eds), 5th Edition, 1998, St. Louis.

CARCINOMA BREAST

Breast cancers are malignancies that develop in one or both breasts and can be either noninvasive or invasive.

Certain women do seem to be at a higher risk of developing the disease—

- Women over the age of 65,
- Inherited faulty gene (BRCA1 and BRCA2).
- Other cancers- cancer of the ovary and colon;
- Women who either have no children or had children late in life,
- Women whose periods started at a very young or menopause occurred late;
- Hormone replacement therapy (HRT) slightly increases the risk.
- Women taking combinations of oestrogen and progesterone seem to have a greater increase in risk than women taking oestrogen alone.

Clinical Features

Early stages— asymptomatic ,painless or could present as a hard lump, the affected breast appear elevated or asymmetric, the nipple may be retracted or scaly, or breast is dimpled like the skin of an orange, bloody or clear discharge from the nipple.

Screening

1. Breast examination

Every woman between the ages of 20 and 49 should have a physical examination by a health professional every one to two years. Those over 50 should be examined annually.

Monthly self-examination

1. Pick a time of the month that is easy to remember and perform self- examination at that time each month. The breast has normal patterns of thickness and lumpiness that change within a monthly period, and a consistently scheduled examination will help differentiate between what is normal from abnormal.

2. Stand in front of a mirror. Breasts should be basically the same size (one may be slightly larger than the other). Check for changes or redness in the nipple area. Look for changes in the appearance of the skin. With hands on the hips, push the pelvis forward and pull the shoulders back and observe the breasts for irregularities. Repeat the observation with hands behind the head. Move each arm and shoulder forward.

3. Lie down on the back with a rolled towel under one shoulder. Apply lotion or bath oil over the breast area. The finger action should be as follows:

Use the 2nd, 3rd, and 4th finger pads (not tips) held together and make dime-sized circles. Press lightly first to feel the breast area, and then press harder using a circular motion.

Using this motion, start from the collar bone and move downward to underneath the breast. Shift the fingers slightly over, slightly overlapping the previously checked region, and work upward back to the collar bone. Repeat this up-and-down examination until the entire breast area has been examined. Be sure to cover the entire area from the collar bone to the bottom of the

breast area and from the middle of the chest to the armpits. Move the towel under the other shoulder and repeat the procedure.

4. Examine the nipple area, by gently lifting and squeezing it and checking for discharge.
5. Repeat step 3 in an upright position.(The shower is the best place for this, using plenty of soap.)

Note: A lump can be any size or shape and can move around or remain fixed. Of special concern are specific or unusual lumps that appear to be different from the normal varying thicknesses in the breast.

2. Mammography screening

Women with risk factors for breast cancer, including a close family member with the disease, should consider having annual mammograms starting 10 years earlier than the age at which the relative was diagnosed.

Women over 40 years old with no special risk factors to have a baseline mammogram at age 40 and then be tested every one to two years until age 50.

After age 50 screening should be annual (women over 65 account for most new cases of breast cancer).

3. Biopsy

A definitive diagnosis of breast cancer made only by biopsy .

4. ER /PR Receptor status

Treatment- The three major treatments of breast cancer are surgery, radiation, and combination drug therapy.No one treatment fits every patient, and some combination therapy is virtually always required.The choice is determined by many factors, including the age of the patient and (among women) menopausal status, the kind of cancer (e.g., ductal vs.lobular),its stage, and whether the tumor contains hormone- receptors or not.

Stage 0

This stage is also called noninvasive carcinoma or carcinoma insitu.

Lobular carcinoma insitu.

(1) Careful monitoring with or without preventive use of tamoxifen or other selective oestrogen- receptor modulators (SERMs).

Ductal carcinoma insitu. Use of tamoxifen or other SERMs after surgery and radiation to prevent recurrence in selected patients.

Stage I and Stage II

StageI. Cancer cells have not spread beyond the breast and the tumor is no more than 2 cm (about $\frac{3}{4}$ of an inch) across.

StageII. One of the following conditions apply: the tumor is less than 2 cm across (lumpectomy followed by radiation), and the cancer has spread to the lymph nodes under the arm; the tumor is between 2 and 5 cm (about $\frac{3}{4}$ inch to 2 inches) with or without spreading to the lymphnodes under the arm (lumpectomy followed by radiation); the tumor is larger than 5 cm but has not spread to the lymphnodes under the arm (mastectomy).

Primary treatment options for Stage I and II breast cancers

Choice of

- (1) Breast-sparing surgery (typically lumpectomy, usually with lymph node sampling) followed by external beam radiation therapy, or
- (2) Modified or radical mastectomy with or without breast reconstruction.
- (3) Removal or radiation of lymph nodes.

Adjuvant and neoadjuvant treatment options. Adjuvant therapy is administered in addition to surgery or radiation therapy to prevent recurrence.

- (1) Combination chemotherapy can be considered for hormone receptor-negative cancers.
- (2) Hormonal therapy with or without chemotherapy for hormone receptor-positive cancers. Tamoxifen is the standard agent and is administered for about five years.

Aromatase inhibitors (letrozole, anastrozole, and exemestane) are proving to be at least as effective as tamoxifen, although the results of these agents in the adjuvant setting are still preliminary.

Stage III (locally advanced)

In this stage, the tumor in the breast is more than 5 cm across, and it has spread (sometimes extensively) to the underarm lymph nodes, or it has spread to other lymph nodes or tissues near the breast. Inflammatory breast cancer is also treated as a Stage III cancer.

Treatment options for Stage III

- (1) Standard therapy is mastectomy usually with radiation therapy and systemic treatment (combination chemotherapy, hormonal therapy, or both).
- (2) Radiation after surgery is recommended for women with four or more involved lymph nodes or an extensive primary tumor. It is not yet clear if radiation would benefit women with one to three involved lymph nodes.

Stage IV (metastasized cancer)

In stage IV the cancer has spread from the breast to other parts of the body. In about 75% of cases, the cancer has spread to the bone. The cancer at this stage is considered to be chronic and incurable and the usefulness of treatments available is limited. The goals of treatment for Stage IV can be a complete or partial response, stabilization of the disease, or slowing of its progression. Unlike many other cancers, stage IV breast cancer patients have responded to as many as five rounds of intervention drug treatments.

Treatment options for Stage IV

- (1) Surgery or radiation for any localized tumors in the breast.
- (2) Chemotherapy, hormonal agents, or both are appropriate for most patients (durable and complete remission possible in 10% to 20% of cases but cure is very rare). Chemotherapy in patients with hormone receptor-negative disease or who have extensive metastasis which requires rapid tumor shrinkage. Ovarian ablation (in premenopausal women) or other hormonal therapies in patients with hormone receptor-positive cancer and no or minimal organ involvement (Aromatase inhibitors, taxanes, and other agents used in combination or in innovative schedules are improving results).
- (3) Metastasis to the brain may require radiation and high-dose steroids.

- (4) Metastasis to the bone (which occurs in 75% of cases) maybe helped with radiation and bisphosphonates (clodronate and pamidronate) by reducing pain and preventing fractures. Such treatments relieve pain and help prevent bone fractures.

Recurrent breast cancer

Recurrent breast cancer is considered to be an advanced cancer. Most recurrences appear within the first two or three years after treatment, but breast cancer can recur many years later. Treatment options are based on the stage at which the cancer reappears, whether the tumor is hormone responsive or not, and the age of the patient. Of 10% to 20% of recurring cancers are local; most are metastatic at presentation. All patients with recurring cancer are candidates for clinical trials.

Psychological support at any stage. Studies have suggested that psychotherapy, group support, or both can relieve pain and reduce stress

Radiation

Radiation is generally in the following ways:

External Beam Radiation. It is usually administered four to six weeks after surgery and delivered externally by an X-ray machine that targets radiation to the whole breast. It may be delivered to the chestwall in high-risk patients (e.g. large tumors, close surgical margins, or lymph node involvement). The treatment is generally given daily for about six weeks. A follow-up boost of radiation therapy in patients with lumpectomies appears to reduce the risk for recurrence.

Brachytherapy (radiation delivered in implants). Implants are most often used as a radiation boost rather than as primary radiation therapy. Nevertheless, some evidence suggests that implants alone can reduce treatment time and maybe as effective as external beam radiation in early stage breast cancer.

Reference

1. Harris JR, Lippman ME, Morrow M, Hellman S. In: Diseases of Breast. Lippincott Raven, Philadelphia, 1996.

CHAPTER 19

PAEDIATRIC CONDITIONS

ESSENTIAL NEWBORN CARE

The components of essential newborn care include:

- Establishment of breathing at birth and neonatal resuscitation.
- Prevention of hypothermia.
- Prevention of infection.
- Early and exclusive breastfeeding.
- Early identification and appropriate referral of high-risk newborns.

Treatment

1. *Establishment of breathing at birth*

If baby is preterm meconium-stained or some evidence of infection, not crying or breathing or muscle tone poor then proceed to initial steps of resuscitation as shown in Figure 2.4 (in Chapter 2 on CPR).

Note: Routine intrapartum oropharyngeal and nasopharyngeal suctioning of babies born through meconium-stained liquor is not recommended. For term babies, use 100% oxygen when baby is cyanotic or when positive pressure ventilation is required. One may begin with less than 100% oxygen or room air. If so, supplementary oxygen should be available to use, if there is no appreciable improvement within 90 seconds after birth. If supplemental oxygen is not available, positive pressure ventilation should be continued with room air.

Medications

Naloxone not to be given by endotracheal route. Babies who require resuscitation are at risk for deterioration after their vital signs have returned to normal. Once adequate ventilation and circulation have been established, the infant should be maintained in or transferred to an environment in which close monitoring and intensive care can be provided.

Discontinuing resuscitative efforts

Infants without signs of life (no heart beat and no respiratory effort) after 10 minutes of resuscitation show either a high mortality or severe neurodevelopmental disability. After 10 minutes of continuous and adequate resuscitative efforts, discontinuation of resuscitation may be justified, if there are no signs of life.

2. *Hypothermia*

(a) Identification of hypothermia. An axillary (or rectal) temperature $<36.0^{\circ}\text{C}$ is hypothermia. Such a baby would feel cold to touch on the abdomen and periphery.

(b) Identification of cold stress: Baby's peripheries are cold but abdomen is warm. This usually corresponds to axillary temperature of $36\text{--}36.4^{\circ}\text{C}$.

<i>Category</i>	<i>Temp. range</i>	<i>Feel by touch</i>	<i>Clinical features</i>	<i>Action</i>
Normal	36.5 to 37.4°C	Warm trunk Warm extremities	Normal baby	<ul style="list-style-type: none"> • Cover adequately with pre-warmed cloth • Keep the baby next to mother • Encourage breast feeding
Mild hypothermia (Cold stress)	36 to 36.4°C	Warm trunk Cold extremities	Extremities bluish and cold Poor weight gain if chronic cold stress	<ul style="list-style-type: none"> • Skin-to-skin contact • Cover adequately • Ensure room is warm • Provide warmth • Encourage breast feeding
Moderate hypothermia	32 to 35.9°C	Cold trunk Cold extremities	Poor sucking Lethargy Weak cry Fast breathing	<ul style="list-style-type: none"> • Cover mother and baby together using pre-warmed clothes • Cover adequately • Provide warmth Reassess every 15 minutes; if temperature doesn't improve, provide additional heat • Encourage breast feeding
Severe hypothermia	Less than 32°C	Cold trunk & cold extremities	Lethargic Poor perfusion Fast or slow breathing Slow heart rate Hardening of skin with redness and edema Bleeding Low blood sugar	<ul style="list-style-type: none"> • Rapid re-warming till baby is 34°C and then slow re-warming • Oxygen • IV fluids - dextrose (warm) • Inj .vitamin K • Reassess every 15 minutes; if temperature doesn't improve, provide additional heat

4. ***Exclusive breastfeeding***

Advise mothers to:

- Start breastfeeding within half an hour of normal birth and within four hours after caesarean section. Do not separate mother from the child.
- Not to give any prelacteal feeds such as honey, water, etc.
- Give breastfeeds to baby on demand as often as the child wants day and night, at least 8 times in 24 hours.
- Give the baby exclusive breastfeeding for at least first 6 months of life. However, there may be situations where it may not be possible to provide human milk, i.e. maternal death, severe maternal illness, and documented lactational inadequacy.
- Not to give water to the baby during period of exclusive breastfeeding.

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5. Early identification of high-risk newborns

Babies born to mothers with eclampsia, antepartum haemorrhage, diabetes, etc. are considered as high-risk newborns and delivery should be conducted at a centre where all facilities for the care of the newborn are available. The following examination at birth or during the first few days would help detect high-risk babies who are in need of immediate referral to an appropriate health facility which has adequate newborn care.

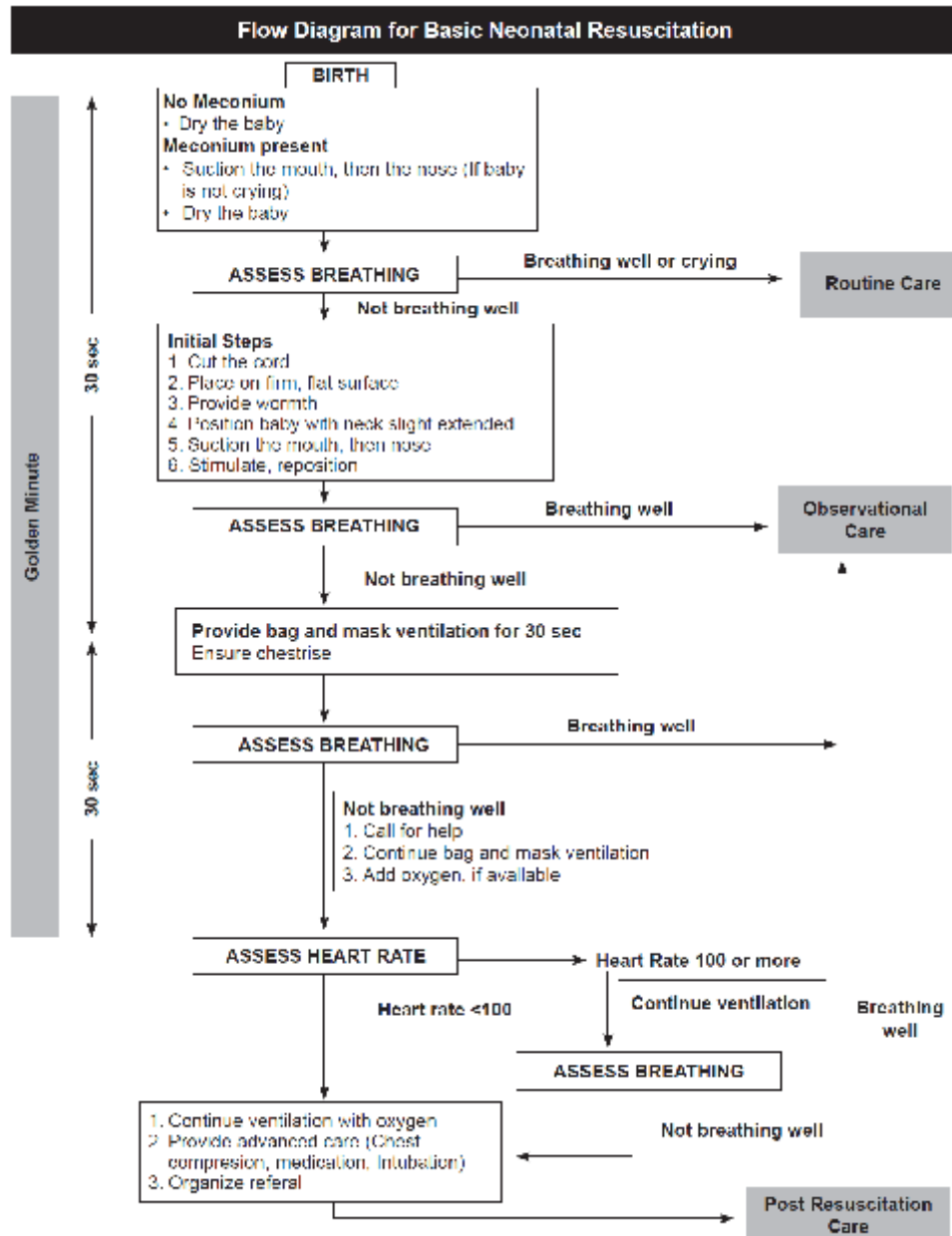


Fig.19.1.Algorithm for neonatal resuscitation.

(a) **Weigh baby.** Babies with birth weights <2000 g are at increased risk of morbidity and mortality and need careful assessment by a physician trained in child health.

(b) **Examine for major malformations.** Most major and life-threatening malformations such as neural tube defects, oesophageal and anal atresias, diaphragmatic hernia, etc. can be detected at birth by careful examination. Some important clues to an underlying malformation are non-passage of meconium at 24 hours of age or non-passage of urine at 48 hours after birth.

(c) **Sucking, activity and cry.** Newborn infants who have poor sucking, are less active than normal and have a weak cry are very ill and need immediate referral.

(d) **Respiratory distress.** Babies who have a respiratory rate of >60 bpm (counted for at least 1 minute and persisting on repeat count) or have severe subcostal retractions have respiratory distress and need immediate referral.

(e) **Identification of severe jaundice.** Yellow staining of the skin within 24 hours of age or when yellow staining of the skin includes the palms and soles at any age, this is severe jaundice and needs immediate referral.

6. *Immunization*

All newborns delivered at a health facility should be given BCG, one dose of oral polio vaccine and Hepatitis B within 24 hours of birth (for details see section on Immunization).

LOW BIRTH WEIGHT BABIES

Clinical features

- Low birth weight (LBW) baby is the one who weighs less than 2500 g at birth.
- Low birth weight may result from either prematurity (gestational age <37 weeks) or intrauterine growth retardation (IUGR), which is also called small-for-date baby (SFD).

Treatment

Indications for hospitalization are:

Birth weight of less than 1800 g; gestational age of less than 34 weeks; neonate who is not able to take feeds from the breast or by cup (katori) and spoon (irrespective of birth weight and gestation); and a sick neonate (irrespective of birth weight and gestation).

1. Keep the LBW babies warm:
 - Room temperature should be kept between 28-30°C. Following methods may be used:
 - Maternal-baby skin to skin contact (Kangaroo mother care). Place the naked baby between the mother's breasts. Wrap baby and mother with a shawl. Cover the baby's head with a cap.
 - Proper clothing—cap, woollen sweaters, socks and mittens.
 - Blankets.
 - Overhead radiant warmer.
 - Incubator.

Nutrition—guidelines to provide fluids and nutrients to low birth weight babies are given in Table 19.1.

Table 19.1. Guidelines to provide fluids and nutrients to low birthweight babies

Age	Category of neonate		
Birth weight gestation	<1200g <30weeks	1200-1800g 30-34weeks	>1800g >34 weeks
Initial	Intravenous fluids (80ml/kg/day) Try gavage feeds if not sick.	Gavage (60ml/kg/day)	Breastfeeding If unsatisfactory, give katori/ spoon feeds
After 1-3 days	Gavage(15-30ml/kg/d), increase by 15-30ml/kg/day to a maximum of 180 ml/kg/day of expressed breast milk	Katori/ spoon maximum of 150-180ml/kg/day	Breastfeed
Later (1-3weeks)	Katori/spoon (150-180 ml/kg/day)	Breastfeed	Breastfeed
After some More time (4-6weeks)	Breast	Breastfeed	Breastfeed

- Vitamin K 1.0 mg (0.5 mg for preterm) IM at birth.
- Vitamin A 1000 IU orally daily—from 1 week age onwards till 6 months of age.
- Vitamin D 400 IU orally daily—from 2 weeks age onwards till 6 months of age.
- Iron 2-4 mg/kg/day orally daily—from 4 weeks age onwards till 6 months of age.
- Vitamin E, calcium and phosphorus supplementation in very LBW (<2000 g, <32 week gestation).

Early detection of sickness by periodic evaluation.

Referral to higher centre in the presence of any one or more of the following signs: Lethargy, refusal to feed, hypothermia, respiratory distress, grunt, apnoea, abnormal weight gain pattern, jaundice over soles and palms, abdominal distension, feed intolerance, cyanosis, pallor, sclerema, seizures and bleeding. LBW babies can be discharged from hospital when they are feeding from breast or breast and cup, gaining weight for 3 consecutive days, no signs of illness, are able to maintain normal body temperature when roomed-in with mother and mother is confident of taking care of the baby. For immunization of LBW babies see section on Immunization.

NEONATAL JAUNDICE

The jaundice can be physiological or pathological.

Clinical features

Cephalopedal progression - Yellow colouration of trunk indicates serum bilirubin range between 10 and 12 mg/dl, whereas staining of palms and soles is ominous as it indicates a serum bilirubin of more than 15 mg/dl.

Physiological jaundice

- Appears between 24 and 72 hours of age, maximum intensity seen on the 4th - 5th day and usually disappears before 14 days of life.
- Peak serum bilirubin always below 15 mg/dl

Pathological jaundice

- May cause bilirubin encephalopathy or kernicterus when unconjugated bilirubin exceeds 20 mg/dl (term baby) or lower levels (preterm babies).
- Appearing within 24 hours, elevation of serum bilirubin levels Requiring plasma transfusion or rise of bilirubin >0.5 mg/dl/hour
- Persistence of jaundice beyond 8 days in term baby and beyond two weeks of age in preterm baby or signs of underlying illness.

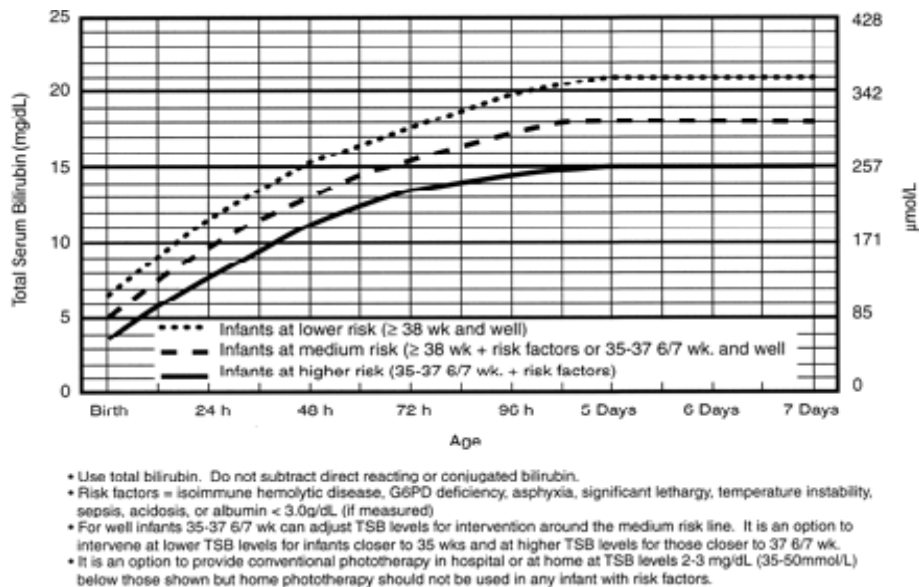
If jaundice persists beyond 2 weeks or 21 days in preterm infants, the baby should be investigated for cholestatic (obstructive) jaundice. If baby's stool is pale and urine is dark, refer the baby to a specialized centre for further evaluation and management.

Treatment

There are two important modalities of treatment:

1. Phototherapy. Most preterm babies are placed under phototherapy, when their serum bilirubin approaches 10-12 mg/dl, and term babies are given phototherapy when their serum bilirubin approaches 15 mg/dl. During phototherapy, the naked infant (with covered eyes) is kept about 45 cm below the phototherapy unit comprising of blue and white tubes or halogen lamps. Non-breastfed babies should be provided additional fl uids at the rate of 20 ml/kg/day. Many babies while undergoing phototherapy may pass greenish-yellow stools which by themselves are not harmful as long as baby is active.

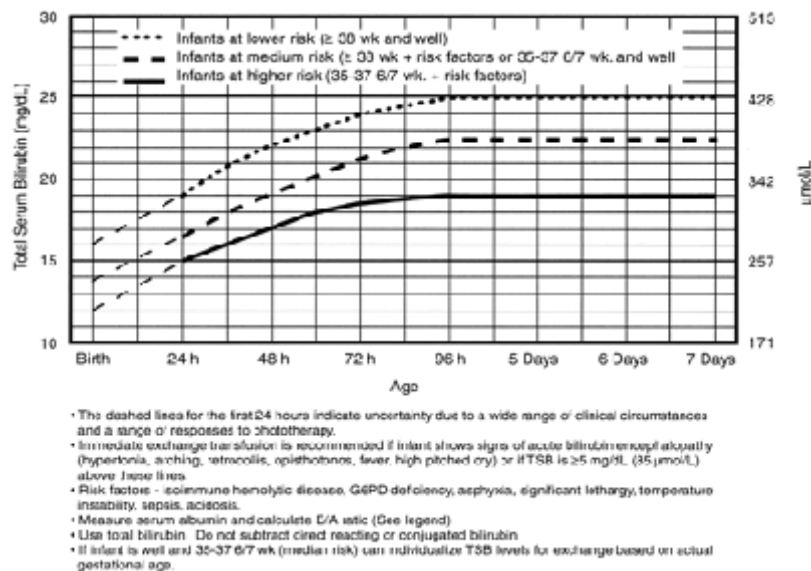
Assessment of severity of jaundice by looking at the skin is unreliable. Estimation of serum bilirubin is necessary to monitor response to therapy.



AAP Guidelines for phototherapy in hospitalized infants of 35 or more weeks' gestation

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2. **Exchange transfusion** should be promptly performed, if any of the following exist:
- (a) **In babies with rhesus haemolytic disease of the newborn:**
- Cord haemoglobin of 10 g/dl or less.
 - Cord bilirubin of 5 mg/dl or more.
 - Unconjugated serum bilirubin of more than 10 mg/dl within 24 hours or rate of rise of more than 0.5 mg/dl/hour.



AAP Guidelines for exchange transfusion in infants 35 or more weeks' gestation.

- (b) **In babies with jaundice due to other causes:**
- Unconjugated serum bilirubin of 20 mg/dl or more in term baby.
 - In preterm babies, serum bilirubin of more than 1.0 mg/100 g weight of the infant (i.e. 10 mg/dl for 1000 g and 15 mg/dl for 1500 g and so on).
 - In the presence of asphyxia, respiratory distress, sepsis, hypothermia, exchange is performed at about 2 mg/dl lower serum bilirubin level than is otherwise indicated.

MANAGEMENT OF COMMON CLINICAL PROBLEMS IN NEWBORNS

There are several phenomena after birth that are normal and mothers only need reassurance. These include:

Milia, Epstein pearls, Mongolian spots, capillary nevi, etc. There are a few developmental variants which may be present and be of concern to the mother. The mother needs to be reassured.

Red rashes on the skin may be seen on 2-3 days of life. These are normal.

Weight loss of 6-8% (10-12% in preterm infants) in the first few days of life is normal and most infants regain their birth weight by 10-14 days.

Regurgitation of feeds and vomiting. Unlike vomiting, non-projectile expulsion of stomach contents without force (regurgitation) is normal and simply needs advice regarding feeding technique.

Bowel disorders. No medication should be prescribed for passage of stools after each feed (exaggerated gastrocolic reflex) as this is normal in some babies. From 3rd to 14 days many exclusively breastfed babies pass loose stools (10-15 times/day) without illness/dehydration. These are transitional stools and require no medication.

Delayed passage of urine. Non-passage of urine by 48 hours after birth may suggest urinary tract anomalies. Such babies need to be investigated. Crying before passing urine is normal.

Jitteriness is abnormal only when it is excessive or persists even during feeding and then it may suggest hypoglycaemia or hypocalcaemia.

Dehydration fever. Transitory moderate fever (up to 38.5°C) usually during the second or third day of life in summer months in an active baby, who sucks well, is normal and responds to lowering the environmental temperature.

Excessive crying. Most baby cry when either they are hungry or are having discomfort such as due to full bladder before passing urine, wet napkin, nose block, etc. Excessive inconsolable crying or high-pitched crying is indicative of meningitis or any other painful inflammatory conditions.

Umbilical sepsis. If there is pus discharge not extending to periumbilical skin, apply 10% Gentian violet or Povidone Iodine locally twice a day. However, if there is periumbilical erythema or induration administer syrup erythromycin 40 mg/kg/day in 3-4 divided doses.

If the newborn has any other high-risk factor, refer to a higher centre.

Umbilical granuloma. A red fleshy-like nodule at the base of umbilical cord can be managed by cautery with Silver Nitrate or application of common salt for 3 to 4 days.

Engorgement of breasts in both sexes and vaginal bleeding after 4 days of birth is normal.

Tongue-tie. Rarely, requires surgical intervention.

See Neonatal Seizures section for its management.

IMMUNIZATION SCHEDULE

Vaccines essential for all children because the infections which they protect against are important national causes of childhood morbidity and mortality (Tables 19.2 and 19.3).

General comments on vaccines

(a) **Simultaneous administration of multiple vaccines.** Both killed and live vaccines can be administered simultaneously without decreasing the efficacy of the individual vaccine. However, vaccines should be administered at different sites using separate needles for each component. A gap of 1 month is recommended between 2 live vaccines, if not given together.

(b) **Injection safety issues.** Avoid giving injections, if skin is infected or compromised by a local reaction (skin lesion or weeping dermatitis). Prepare skin with a disinfectant. Always use a sterile syringe and needle for each injection and to reconstitute each unit of medication. After use, syringes and needles should be disposed off carefully as per guidelines.

Table 19.2.National immunization schedule (Universal Immunization Programme)

BCG	Birth or 6weeks.
OPV	Birth,6,10,14 weeks, 15-18 months.
Hepatitis B	Birth, 6, 10, 14 weeks
Pentavalent vaccine	6, 10, 14 weeks,
DPT booster	16-24 months.
Measles	9 months.
MMR	15-18 months.
DT	5 years.
TT	10 and 16 years (if given for first time at this age, give 2 doses at 4 weeks Interval).

Vaccine	Diluent	Schedule	Dose, route & site	Contra-indication	Adverse effects
BCG (freeze-dried)	Normal Saline	Single dose at birth or at first encounter	0.1ml intradermal left deltoid	Immuno-deficiency	Axillary lymphnode adenitis
DPTwc(whole cell vaccine) DPTa(acellular vaccine)	None(liquid form)	3 primary doses at 6, 10, 14 weeks; booster at 18 month and 5 years	0.5ml IM anterolateral aspect of thigh	Progressive neurological disease, Severe reaction to first dose	Fever, local pain & induration, incessant crying, rarely encephalopathy
OPV	None (liquid form)	3 primary doses at 6, 10, 14 weeks; booster at 18 month and 5 years	2 drops orally	Immunodeficiency, HIV disease	VAPP rarely
H. infu B 10 mcg of capsular	None (liquid form)	3 primary doses at 6, 10, 14 weeks; booster at 18 months	0.5ml IM Anterolateral aspect of thigh	None	Local pain, erythema, mild fever
Measles (lyophilized)	Sterile Water	Single dose at 9 months	0.5 ml SC deltoid/thigh	None	Mild fever, mild rash after 7 days
MMR (Lyophilized)	Sterile Water	2 doses at 15 months and 4-5 years	0.5 ml SC deltoid/ thigh	Systemic hypersensitivity to neomycin	Mild fever, mild rash after 7 days
Varicella (Lyophilized)	Sterile Water	2 doses at 15 months and 4-5 years	0.5 ml SC Deltoid	Systemic hypersensitivity to neomycin	Milder varicella type rash
Hepatitis A	None	After one year	0.5 ml IM	None	Local pain,

Vaccine	Diluent	Schedule	Dose, route & site	Contra-indication	Adverse effects
	(Liquid form)	two doses at 0, 6 months	Thigh		erythema
Typhoid Vi antigen vaccine 30 mcg of inactivated Vi capsular polysaccharide	None (Liquid form)	First dose after two years, booster every 3 year	0.5 ml IM Deltoid	None	Mild local reaction
Meningococcal (A+C) (Lyophilized) 50 mcg each serotype of Inactivated capsular polysaccharide	Sterile Water	2 years and above during epidemics	0.5 ml IM or SC deltoid/thigh	None	Mild fever; local reaction
Japanese encephalitis	Sterile Water	Routine use in high risk area; Two doses at one month interval for children >1 year; booster every 3 years	1-3 years: 0.5ml > 3 years: 1.0 ml SC deltoid	Hypersensitivity to first dose	Local reactions; allergies; rarely encephalitis
	None (Liquid form)	Single dose for high risk children >2 years	0.5 ml IM or SC anterolateral aspect of thigh/deltoid	None	Local reaction

Note: All vaccine should be stored at +2⁰ to +8⁰ C except OPV which should be stored at -20°C or below.

Immunization in special circumstances

1. Immunization in preterm infants: In general, all vaccines may be administered as per schedule according to the chronological age irrespective of birth weight or period of gestation. Very low birth weight/preterm babies can be given immunization, if they are stable otherwise.

2. Children receiving corticosteroids: Children receiving oral corticosteroids in high doses (Prednisolone 1-2 mg/kg/day) for more than 14 days should not receive live virus vaccines until the steroid has been discontinued for at least one month. Killed vaccines are safe but may not be completely effective in such situations. Patients on topical or inhaled steroids should not be denied their age appropriate vaccine.

3. Children awaiting splenectomy: Immunization with pneumococcal, Hib, and meningococcal vaccine should be initiated a few weeks prior to splenectomy.

4. Vaccination in children with HIV infection: Immune response may be suboptimal as it depends on the degree of immunodeficiency at that point of time. Readministration of childhood

immunization may be considered when their immune status has improved following anti-retroviral therapy.

5. Lapsed immunization: There is no need to restart a vaccine series regardless of the time that has elapsed between individuals doses. In case of unknown or uncertain immunization status, however, it is appropriate to start the schedule as for an unimmunized child.

6. Minor illnesses, e.g. fever, diarrhoea, respiratory infections and malnutrition should not be construed as contraindications to immunization.

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FLUID AND ELECTROLYTES

Fluid and electrolyte therapy is divided into three phases:

1. Correction of pre-existing deficits. The losses, via renal or extra-renal route, should be estimated and corrected as soon as possible; for example, rehydration therapy for diarrhoeal dehydration.
2. Provision of maintenance requirements for normal metabolism.
3. Correction of ongoing losses. These may occur via the gastrointestinal tract through losses (as in diarrhoea, vomiting, etc.) or removal (suction, aspiration, etc.). Replacement of such losses should be similar in type and amount to the fluid being lost.

Out of these three phases, we shall discuss the maintenance requirements here. Correction of pre-existing deficits and correction of ongoing losses shall be discussed, wherever relevant (see section on Diarrhoea).

Maintenance requirements in children

A guideline for estimating daily fluid and electrolytes requirement in a normal child under normal conditions is: Water-100 ml/100 Kcal/day; sodium-1-3 mEq/100 Kcal/day; potassium-1-2 mEq/100 Kcal/day. Hence, the fluid requirement based on caloric requirement for different weight groups can be calculated as follows:

Weight	Fluid requirements
3-10 kg	100 ml/kg/day
10-20 kg	1000 + 50 ml/kg/day for each kg >10.
> 20 kg	1500 + 20 ml/kg/day for each kg >20.

Refer to the section on newborn care for guidelines on fluid therapy in neonates and those weighing <3.0 kg.

The most commonly employed intravenous maintenance fluid employed in children is N/5 (0.18%) sodium chloride in 5% glucose + potassium chloride 20 mEq/liter. Commercially it is available as Isolyte P, Kidral, etc.

Maintenance requirements in newborns

Table 19.5 provides the normal fluid electrolyte requirements in newborn babies.

Table 19.5. Normal fluid requirements of newborns

Age (days)	Total fluids	Glucose/Dextrose (ml/kg/day)	Electrolyte
1	60	10% Dextrose in water	None
2	70-80	-do-	None
3	80-90	-do-	Sodium 2-3 mmol/kg/day Potassium 2 mmol/kg/day
4	90-100	-do-	-do-
5	100-110	-do-	-do-
6	110-120	-do-	-do-

From day 3 onwards, fluid containing glucose-electrolyte mixture can be provided using commercially available paediatric maintenance intravenous solutions provided 5% weight loss has been documented.

The fluid and electrolyte requirement from day 7-28 remains the same. However, in babies <1500 g, the fluid requirement after day 7 need to be increased by 10-20 ml/kg/day till a maximum of 150 ml/kg/day.

Conditions that increase fluid requirement

- Fever: For every 1°C increase over 37.5°C, the fluid requirement increases by 10 ml/kg/day.
- Phototherapy: This increases fluid requirement by 10-20 ml/kg/day.

Conditions that decrease fluid requirement

- Congestive cardiac failure: Fluid requirements are reduced to two-thirds of the normal need for that age.
- Renal failure: In cases of decreased urinary output, the fluid regimen is 400 ml/m²/day for insensible water losses plus urinary output over the day. Potassium should be added with caution or omitted in suspected cases of acute renal failure.

(see also Fluid and Electrolyte Imbalance in Chapter 2).

HYPONATRAEMIA

It is defined as serum sodium <135 mEq/L. Clinical symptoms appear when levels fall below 120 mEq/L.

Clinical features

- Drowsiness, seizures and coma
- Hypotension, and circulatory failure.

Treatment

1. If fluid overload, renal failure, or SIADH is present, restrict fluid intake to two thirds of the normal maintenance. If dehydration is present, expand ECF volume by giving isonatremic fluids intravenously depending on the degree of dehydration.

2. Correction of asymptomatic hyponatraemia should be gradual (increase the Na⁺ by 0.5 mEq/L/h) to a maximum change of about 12 mEq/L in the first 24 h. Rapid correction can cause coma.
3. Acute symptomatic hyponatraemia is treated with administration of 3% sodium chloride 1-2 ml/kg/h till symptoms resolve. Chronic hyponatraemia should be corrected over a period of 48 hours.

The deficit is calculated as follows:

$$\text{Sodium deficit} = [\text{desired Na}^+ - \text{present Na}^+] \times \text{weight} \times 0.6$$

HYPERNATRAEMIA

It is defined as serum sodium >145 mEq/L, consequent to:

- Excessive administration of sodium (accidental salt administration in ORS),
- Inadequate water intake
- Excessive water losses.

Clinical features

- Altered sensorium weakness, irritability,
- Focal neurologic deficits, and even coma or convulsions.

Treatment

Identify and treat the underlying cause.

Replace water deficit as assessed by degree of dehydration over a period of 48 hours with a solution containing 40 mEq/L of sodium.

The quantity of water needed to correct hypernatraemia can be calculated by using the following equation:

$$\text{Estimated water deficit} = \frac{(1 - 145)}{\text{current sodium level}} \times 0.6 \times \text{Body weight}$$

Over rapid correction may

lead to cerebral oedema. (**Caution:** Sodium free solutions are never used except when hypernatraemia is acute, i.e. onset within few hours).

Monitor serum sodium closely to ensure a gradual fall (and prevent rapid fall) in serum sodium.

Serum sodium >180 mEq/L may require urgent dialysis.

(see also Fluid and Electrolyte Imbalance in Chapter 2).

HYPOKALAEMIA

It is defined as serum potassium <3.5 mEq/L.

Clinical Features

- Muscle weakness, hypotonia, leg cramps
- Respiratory difficulty,
- Paralytic ileus,

- ECG changes - ST depression, T wave flattening/inversion, U waves and arrhythmias. Pulseless electrical activity or asystole may develop.

Treatment

- Identify and treat the underlying cause.
- Correct the deficit with potassium supplements @ 40 mEq/L of fl uids. The amount of fluid is dictated by the hydration status of the child. Potassium chloride may be given orally (15 ml = 20 mEq). Intravenous correction with KCl (0.5-1 mEq/kg over 1 hour) is required when patient is unable to take orally, serum potassium is <2.5 mEq/L, has respiratory paralysis, or in the presence of arrhythmia.
- Correct the potassium deficit over a period of 24 hours.
- Potassium rich foods such as banana or fruit juice may be advised on long-term basis, especially in undernourished children.

HYPERKALAEMIA

It is defined as serum potassium >5 mEq/L.

Clinical features

- Paraesthesias ,weakness,
- Ascending paralysis,
- Respiratory failure
- Tetany.
- ECG changes - high peaked t waves, prolonged pr interval, widened qrs complex, heartblocks, and arrhythmias in that order. It is life-threatening and requires immediate therapy.

Treatment

1. **Mild hyperkalaemia:** Serum K⁺ 5 to 6 mEq/L is managed by stopping the potassium intake and offending drugs such as potassium sparing diuretics, ACEI, NSAIDs, correction of acidosis and intravascular volume. Diuretics—inj. furosemide 40-80 mg IV and kayexalate 15-30 g in 50-100 ml of 20% Sorbitol orally or by retention enema.

2. **Moderate hyperkalaemia** (serum K⁺ 6 to 7 mEq/L or peaked T waves) is managed by administering a glucose insulin infusion (0.5 g/kg glucose with 0.3 U regular insulin/g glucose, over 2 hours) and/or a sodium bicarbonate infusion (2 mEq/kg over 5-10 min), in addition to the measures already mentioned. Can be repeated 4-6 hourly.

3. Patients with **severe hyperkalaemia** (serum K⁺ >7 mEq/L or ECG changes apart from tall T waves) should be urgently administered intravenous 10% calcium gluconate 0.5 ml/kg over 5-10 minutes. This immediately reverses the cardiac effects of hyperkalaemia. This should be followed up with the measures as for moderate hyperkalaemia. Intravenous Salbutamol (4 mcg/kg in 5 ml water) or nebulised salbutamol (2.5-5.0 mg) given over 15-20 minutes also acts rapidly to lower serum K⁺. Dialysis has to be done in case the hyperkalaemia is refractory to therapy as in renal failure.

4. Monitoring of the therapy should be done with ECG and serum potassium levels after 1-2 h of initial intervention following which frequency can be reduced depending on the potassium levels and reversibility of the cause.

References

1. Electrolytes & Acid Base Disorders. In: Nelson's Text Book of Paediatrics. 19th Edition 2011; Elsevier, PA, Kleigman, Stanton, St Geme et al (eds). Pp. 212-249.
2. Facility Based IMNCI (F-IMNCI) Participants Manual. WHO, UNICEF, and Ministry of Health & Family Welfare, Government of India, 2009.
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ANAEMIA

A haemoglobin (Hb) level below 11 g/dl for children 6 months to 6 years old, and <12 mg/dl for children 6-14 years is considered as anaemia.

1. **Anaemia due to decreased RBC production.** It may be due to:
 - (a) Deficiency of iron, folic acid, vitamin B12, copper, protein, etc.
 - (b) Bone marrow infiltration - acute and chronic leukaemia, disseminated malignant diseases, myelofibrosis, etc.
 - (c) Bone marrow aplasia- aplastic anaemia, pure red cells aplasia
2. **Anaemia due to increased RBC destruction**, i.e. haemolytic anaemia-thalassaemia major, sickle cell disease, hereditary spherocytosis, G6PD deficiency, haemolytic anaemia, malaria, etc.
3. **Anaemia due to excessive blood loss** -massive oesophageal variceal bleeding, rectal polyps, etc. In cases like ankylostomiasis, Meckel diverticulum, etc., there may be only occult bleed.

Clinical approach in a child with anaemia

- (a) Nutritional iron deficiency anaemia (IDA) is uncommon below 6 months of age in term born child with normal birth weight.
- (b) Most thalassaemics are normal at birth and usually start becoming anaemic between 6-18 months of age.
- (c) Constitutional aplastic anaemia (Fanconi pancytopenia) presents between 5-10 years, whereas congenital pure red cell aplasia can manifest in first few months.
- (d) Megaloblastic anaemia occurs in infants and toddlers preschool children with prolonged exclusive breastfeeding by undernourished mothers.
- (e) Presence of splenomegaly and hepatomegaly suggests the diagnosis of either haemolytic anaemia or leukaemia (usually there is associated lymphadenopathy) or anaemia of chronic infection/inflammation.
- (f) Presence of petechial and/or purpuric spots is suggestive of concomitant thrombocytopenia and points towards the diagnosis of acute leukaemia, aplastic anaemia or megaloblastic anaemia.

Investigations

Initial investigations to be carried out in cases of anaemia—estimation of Hb%, TLC, DLC and platelet count, examination of peripheral blood smear for RBC size and shapes, anisopoikilocytosis, presence of immature cells and haemoparasites, reticulocyte count. Currently, most of the laboratories use electronic cell counters for haematological investigations which give additional useful information such as MCV, MCH, MCHC, etc.

The following important information can be gathered from the above investigations:

- (a) Type of anaemia on the basis of cell size, such as microcytic (MCV <80fl), normocytic and macrocytic (MCV >90fl), and on the basis of Hb content, i.e. hypochromic or normochromic.
- (b) Associated thrombocytopenia and/or neutropenia (bicytopenia or pancytopenia) is suggestive of aplastic anaemia, megaloblastic anaemia, or bone marrow infiltration due to leukaemia, etc.
- (c) Increased, normal or decreased reticulocyte count is suggestive whether anaemia is due to decreased production or increased destruction of RBCs.

The following section describes the differential diagnosis of cases of anaemia according to preliminary investigations results:

1. Microcytic hypochromic anaemia

Two important causes are:

- i. IDA—reticulocyte count is normal or mildly elevated.
- ii. Thalassaemia major—reticulocyte count is usually 4-6%. Peripheral smear also shows target cells and numerous nucleated RBCs. Elevated foetal haemoglobin (HbF) on blood electrophoresis confirms the diagnosis. Lead poisoning and pyridoxine responsive anaemia, sideroblastic anaemia and copper deficiency are rare.

2. Macrocytic normochromic anaemia

- i. Megaloblastic anaemia of B12 and folate deficiency is common and may have associated neutropenia and/or thrombocytopenia. Reticulocyte count is usually low. Bone marrow examination reveals megaloblastic changes.
- ii. Other causes of macrocytic anaemia are liver diseases, hypothyroidism, thiamine deficiency and some inborn errors of metabolism.

3. Normocytic normochromic anaemia

This group comprises a large number of causes:

- i. Congenital or acquired aplastic anaemia—usually have bicytopenia or pancytopenia and decreased reticulocyte count. Bone marrow aspiration or biopsy is confirmatory.
- ii. Bone marrow infiltration such as leukaemia and other neoplasms, storage disorders, myelofibrosis, etc. Diagnosis is confirmed by bone marrow examination.
- iii. Haemolytic anaemia—such as immune haemolysis, hereditary spherocytosis, G6PD deficiency, etc. Reticulocyte count is increased.
- iv. Anaemia resulting from acute blood loss.

(see also Anaemia in Chapter 1 and Anaemia in Pregnancy in Chapter 15).

IRON DEFICIENCY ANAEMIA (IDA)

Causes

- Nutritional deficiency
- Prematurity,
- Perinatal blood loss

- Cow milk feeding

Clinical features

- Pallor,
- Irritability,
- Pica
- Absence of organomegaly and lymphadenopathy (10-15% may have mild splenomegaly).

Treatment

Iron deficiency anaemia is very common between the age of 9 month and 1 year because of transition of diet and is also known as physiological anaemia of infancy.

Regular supplementation of iron in dose of 1 mg/kg/day is recommended in children after 6 month of age and in premature babies, after 4 months of age.

If any child does not respond to oral therapy, then he should be investigated for other cause of anaemia such as

Nonpharmacological

After the period of exclusive breastfeeding (6 months), cereal based diet should be added. Encourage green leafy vegetables and fruits.

Pharmacological

Severe anaemia (Hb <6 g/dl)

Blood transfusion to all children with Hb \leq 4g/dl and children with Hb 4-6 g/dl with any of the following: dehydration, shock, impaired consciousness, heart failure, fast breathing, very high parasitaemia (>10 of RBCs)

1. Give packed cell transfusion, usually 2-3 ml/kg at one time under close monitoring to severely anaemic children (Hb <4-5 g/dl).
2. Inj. Frusemide (1 mg/kg/dose) may be administered, if there is evidence of cardiovascular overload.

Mild (<11 g/dl) to moderate anaemia (6-9 g/dl)

Initiation of therapy. Oral ferrous salts (sulphate, gluconate, etc.) are the preferred therapeutic iron preparation. Syr./Drops/Tab. Ferrous Sulphate/Ferrous gluconate/Ferrous fumarate 2-3 mg/kg/day of elemental iron in 2-3 divided doses to be given between meals for 8-12 weeks after normal Hb concentration for age is achieved.

Older children who can take tablets Iron Folic acid tablets and Tab Vitamin B12 Usual Iron preparations have 35-50 mg elemental iron per 5 ml of syrup or per ml of drops. Elemental content of various ferrous salts is – Ferrous sulphate 20%, Ferrous gluconate 12%, Ferrous fumarate 33%, Colloidal iron 50%.

(Caution: Milk or milk products, tea or any other calcium preparation should particularly be avoided one hour before or after the drug).

Response to therapy. Decreased irritability and improved appetite is seen in 12-24 hours. Reticulocytosis is seen within 2-3 days and rise in Hb is noticeable by 5th-7th day. Rate of rise of Hb is 0.25-0.4 g/dl/day (daily or even weekly estimation of Hb% is not required). Usually normal Hb levels are obtained by about 8-12 weeks.

If the response is inadequate, check for the prescribed dose, compliance, presence of diarrhoea and/or malabsorption, infections (particularly urinary tract infection and tuberculosis), occult blood loss

or congenital hemolytic anaemia and disorders of RBC production(β thalassaemia trait) which may have been misdiagnosed as IDA.

Modification or step up therapy. *Parenteral iron therapy is usually not recommended in children.* However, it is necessary, if there is interference to absorption of oral iron, chronic diarrhoea or malabsorption, occult bleeding from GIT when oral iron therapy may not maintain desired Hb. Parenteral iron therapy may also be used in severely anaemic child not likely to take oral therapy because of socioeconomic reasons.

When parenteral iron is required, the total dose may be calculated:

Dose of iron required (mg) = wt (kg) \times 2.5 \times Hb deficit

Hb deficit is the difference of desired normal Hb and present Hb.

To this dose, 10 mg/kg should be added for replenishing the stores.

Inj. Iron Dextran or Iron Sorbitol Citric acid complex (50 mg/ml) deep gluteal IM injection (preferred) or infusion after a test dose.

The total dose of iron may be given as a single dose IV or as multiple daily doses IM not exceeding 5 mg/kg/dose spread over several days, if the volume is too large.

Reference

1. Diseases of the Blood. In: Nelson's Textbook of Paediatrics. Behrman RE, Kliegman RM, Jenson HB (eds), 19th Edition, WB Saunders Co, 2011; pp. 1648-1650.

PROTEIN ENERGY MALNUTRITION (PEM)

Nutritional marasmus and kwashiorkor are two extreme forms of malnutrition. Such extreme forms are rare; most cases suffer from mild and moderate nutritional deficit.

Clinical Features

- Milder forms may just present with failure to thrive, i.e. decreased rate of weight gain.
- Marasmus is characterized by gross wasting of muscle and subcutaneous tissues resulting in emaciation, marked stunting, and no oedema.
- Markedly retarded growth, psychomotor changes, and oedema of dependent parts are three essential clinical features of kwashiorkor.
- PEM is usually associated with:
 1. Anaemia due to iron, protein, vitamin B12, or folic acid deficiency,
 2. Xerophthalmia due to vitamin A deficiency, and
 3. Other micronutrient deficiencies including magnesium, copper, zinc, vitamins B, C, D and K.

Assessment of nutritional status

Undernutrition is classified by WHO into moderate and severe forms as shown in

Table 19.6. Reference values for weight for height are provided in Table 19.7.

Severe Acute Malnutrition(SAM)

SAM among children of 6-59 months of age is defined by UNICEF as any of the following:

1. Weight for height below -3 SD of median WHO growth reference
2. Visible severe wasting

3. Presence of bilateral pedal oedema
4. Mild upper arm circumference <11.5cm.

These children are at high risk of death and they require urgent attention and management in the hospital. In children of <6 month of age MUAC cannot be used, and SAM should be diagnosed in the presence of 1, 2, and 3.

Table 19.6.WHO Classification for severity of undernutrition

	Moderate undernutrition	Severe undernutrition
Symmetrical oedema	No	Yes ^a
Weight for height (measure of wasting)	SD score ^b -2 to -3 (70-79% of expected ^c)	SD score ≤ 3 (<70 % of expected)
Height for age (measure of stunting)	SD score ^b - 2 to - 3 (85-89% of expected ^c)	SD score ≤ 3 (<85 % of expected)

- a. This includes kwashiorkor and marasmic kwashiorkor.
- b.
$$\text{SD score} = \frac{\text{Observed value} - \text{expected value}}{\text{Standard deviation of reference population}}$$
- c. Median (50th percentile of NCHS standards).

Table 19.7.NCHS/WHO Normalized reference values for weight-for-height/length

Boys' weight (kg)			Length (cm)	Girls' weight (kg)		
-3 SD	-2SD	Median		Median	-2SD	-3SD
2.6	2.8	3.3	50	3.4	2.8	2.6
3.6	3.8	4.5	55	4.5	3.8	3.5
4.7	5.1	6.0	60	5.9	4.9	4.5
5.7	6.2	6.3	65	7.1	5.9	5.5
6.6	7.2	8.4	70	8.2	6.9	6.3
7.5	8.1	9.5	75	9.1	7.7	7.1
8.2	8.9	10.4	80	10.1	8.5	7.8
9.1	9.8	11.5	85	11.2	9.4	8.7
10.1	10.9	12.7	90	12.5	10.5	9.7
11.0	11.9	13.9	95	13.7	11.5	10.6
12.0	12.9	15.2	100	15.0	12.6	11.6
13.0	14.1	16.6	105	16.5	13.8	12.7
14.2	15.4	18.3	110	18.3	15.3	14.0

SD – standard deviation score (or z score).

Indian Academy of Paediatrics (IAP) takes a weight of more than 80% of expected for age as normal. Grades of malnutrition are: Grade I (71-80%), Grade II (61-70%), Grade III (51-60%) and Grade

IV ($\leq 50\%$) weight of expected value for that age. Alphabet k is post-fixed in the presence of oedema.

Treatment

1. Mild to moderate undernutrition. Mild and moderately under-nourished children are best treated in their own home surroundings. Domiciliary treatment of malnourished children by their mother is economical, offers in-built advantage of practical health education, and is associated with minimal recurrence risk.
2. The parents should be advised to increase the food intake of the child by all available means. The child should receive adequate amount of calories and protein in the diet, which should be prepared from the locally available, inexpensive foods.
3. The child should be kept under surveillance by using a growth chart and effort should be made that he does not slip down to severe malnutrition.

10 steps of management of malnutrition-

1. Treat/prevent hypoglycaemia
2. Treat/prevent hypothermia
3. Treat/prevent dehydration
4. Correct electrolyte imbalance
5. Treat/prevent infection
6. Correct micronutrient deficiencies
7. Start cautious feeding
8. Achieve catch-up growth
9. Provide sensory stimulation and emotional support
10. Prepare for follow-up after recovery

These steps are accomplished in two phases: an initial stabilisation phase where the acute medical conditions are managed; and a longer rehabilitation phase. Note that treatment procedures are similar for marasmus and kwashiorkor.

Assess	Classify	Action to take
If age upto 6 months and <ul style="list-style-type: none"> • Visible severe wasting • W/L $< 70\%$ or • Oedema of both feet If age 6 months and above and MUAC < 11 cm or oedema of both feet or W/H $< 70\%$ and one of the following <ul style="list-style-type: none"> • Danger sign • Fail appetite test or • Severe Pneumonia or • Blood in stool or • Fever/hypothermia 	Severe Complicated Malnutrition	Refer urgently to Therapeutic Feeding Unit (TFU), also called Stabilization Centre (SC) for an in-patient management of the child.
If age 6 months and above and <ul style="list-style-type: none"> • MUAC < 11 cm or oedema of both feet or W/H $< 70\%$ and 	Severe Uncomplicated	Manage in OTP using the health post OTP protocol

Assess	Classify	Action to take
• Pass appetite test	Malnutrition	
If MUAC 11 cm to 11.99 or W/H 70% to 79.99% and No oedema of both feet	Moderate Acute Malnutrition	Refer to supplementary feeding program if available Counsel on child feeding and care
If MUAC \geq 12 cm and no oedema of feet	No acute malnutrition	Counsel the mother and congratulate her

TIME FRAME FOR 10 STEPS

Stabilisation		Rehabilitation
Day 1-2	Days 3-7	Weeks 2-6
Hypoglycemia ----- >		
Hypothermia ----- >		
Dehydration ----- >		
Electrolytes ----- >		
Infection ----- >		
Micronutrients -----no iron-----with iron----- >		
Cautious feeding ----- >		
Catch up growth ----- >		
Sensory stimulation ----- >		
Prepare for follow-up ----- >		

Hospital management of severe malnutrition is given in (Table 19.8). Initial treatment involves managing complications. The aim is to treat complications and stabilize the child.

Severe malnutrition

Severely wasted children and those with oedema need hospitalization. Other indications for admission in an undernourished child are severe dehydration, severe diarrhoea, hypothermia, shock, systemic infection, severe anaemia, jaundice, bleeding, age less than one year, or persistent loss of appetite. Those with severe stunting alone may be managed in the community. Hospital management of severe malnutrition is summarized in Table 19.8.

Table 19.8. Hospital management of severe malnutrition

Problem	Measurement
Hypothermia (rectal temperature $<35.5^{\circ}\text{C}$)	<ul style="list-style-type: none"> Keep under a heat source, such as radiant warmer, room heater, hot air blower or 200 W bulb, and warm upto rectal temp. 37.0°C within in 2-3 hours. If electric gadgets are not available, cover the child well. Warm up with Kangaroo technique (placing the naked child on mothers' bare chest and covering them both together with cloth and blanket). Monitor rectal temperature half hourly. Investigate and treat for infection and

Problem	Measurement
	<p>hypoglycaemia.</p> <p>Check for hypoglycemia, whenever, hypothermia is found.</p> <p>Prevent hypothermia</p>
Hypoglycaemia (blood sugar <54 mg/dl)	<ul style="list-style-type: none"> • 10% glucose, 5-10 ml/kg IV immediately followed by IV infusion of a dextrose containing solution. • If IV dose cannot be given immediately, give the nasogastric dose first. Give appropriate antibiotics and start feeding as soon as possible. Give 2-hourly feeds, day and night, at least for the first day. • If the initial blood glucose was low, repeat the measurement (using finger prick or heel prick blood) and estimate blood sugar after 30 minutes. If the axillary temperature falls <35°C or if there is deterioration in the level of consciousness anytime, repeat the blood sugar measurement
Dehydration (as assessed by WHO classification)	<p>Whenever possible, rehydrate a dehydrated child with severe malnutrition orally or through a nasogastric tube. In addition to ORS start potassium supplements to prevent hypokalemia (syrup potassium chloride-15 ml of the syrup provides 20 mEq of potassium (See hypokalaemia)</p> <ul style="list-style-type: none"> • ORS 5 ml/kg body weight every 30 minutes for the first 2 hours; then 5-10 ml/kg alternate hours for up to 10 hours. The amount offered in this range should be based on the child's willingness to drink and the amount of ongoing losses in the stool. Starter formula is given in alternate hours during this period until the child is rehydrated. Monitor every 30 min for the first 2 h and then hourly. Check respiratory rate, pulse rate, urine output and frequency of stools and vomiting. • If the child has already received IV fluids for shock and is switching to ORS, omit the first 2-hour treatment and start with the amount for the next period of up to 10 hours. • Stop ORS immediately on signs of overhydration (increasing respiratory rate by 5/min and pulse rate by 15/min), and reassess after 1 h.
Severe dehydration: weak pulse, oliguria	<ul style="list-style-type: none"> • The only indication for IV infusion in a severely malnourished child is circulatory collapse caused by severe dehydration or septic shock. • Severe dehydration: Administer (N/2) saline with 5% dextrose at slower infusion rates of 15 ml/kg over the first hour with continuous monitoring (pulse rate, pulse volume, respiratory rate, capillary refill time, urine output). • Monitor pulse and respiratory rates every 5-10 min.

Problem	Measurement
	<p>If there is improvement (pulse slows; faster capillary refi ll) at the end of the fi rst hour of IV fluid infusion, consider diagnosis of severe dehydration with shock. Repeat rehydrating fluid at the same rate over the next hour and then switch to ORS at 5-10 ml/kg/hour, either orally or by nasogastric tube. If there is no improvement or worsening after the fi rst hour of the fluid bolus, consider septic shock and treat accordingly (Fig. 19.3).</p> <p>Caution:</p> <ul style="list-style-type: none"> • Do not use 5% dextrose alone • Add potassium to the IV fluids at the rate of 1.5 ml per 100 ml after the patient passes urine. 1 ml of potassium chloride provides 2 mmol of potassium. Do not increase to more than 40 mEq/litre. • Monitor frequently and look for features of over hydration and cardiac decompensation. • Increasing respiratory rate (> 5 per minute) and increasing pulse rate (> 15 per minute), increasing oedema and periorbital puffi ness indicates overhydration which may be dangerous and may lead to heart failure
Septic shock (clinical features similar to severe dehydration)	<p>See Fig. 19.3 Give blood/plasma transfusion 10 ml/kg over 3 hours.</p> <ul style="list-style-type: none"> • Start antibiotics; as given in Infections. • Fluid management is similar to that of severe dehydration.
Dyselectrolytaemia	<ul style="list-style-type: none"> • Give supplemental potassium at 3-4 mEq/kg/day for at least 2 weeks. Potassium can be given as syrup potassium chloride; the most common preparation available has 20 mEq/15 ml. • On day 1, give 50% magnesium sulphate IM once (0.3 ml/kg up to a maximum of 2 ml). Thereafter, give extra magnesium (0.4–0.6 mEq/kg daily) orally. If oral commercial preparation is not available give injection magnesium sulphate (50% which has 2 mEq/ml) orally as magnesium supplements mixed with feeds for 2 weeks. • Prepare food without adding salt to avoid sodium overload.
Infections	<ul style="list-style-type: none"> • Assume all children with severe malnutrition admitted in a hospital have an infection and give broad-spectrum antibiotics. If specific infections are detected such as dysentery, malaria, pneumonia, worm infestations, tuberculosis, treat as per STG of that particular condition. (Table 19.9). • Hypoglycaemia and hypothermia are often signs of severe infection

Problem	Measurement
Congestive heart failure (tachycardia, cardiomegaly)	<ul style="list-style-type: none"> Restrict fluid intake. Give Inj Frusemide 1 mg/kg stat
Severe anaemia (haemoglobin < 4 g/dl)	<ul style="list-style-type: none"> Give whole blood or packed cell transfusion, if Hb is < 4g/dl or Hb is 4-6 g/dl and child has respiratory distress. Give 10 ml/kg slowly over 4-6 hours and give Inj. Frusemide 1mg/kg at the start of the transfusion. Do not repeat blood transfusion within 4 days.
Vitamin A deficiency	<ul style="list-style-type: none"> Give a single dose of vitamin A orally to all children: <6 months: 50,000 IU; 6 months - 1 year: 1,00,000 IU; >1 year: 2,00,000 IU; Children < 8 kg irrespective of age should receive 1,00,000 IU orally. Give half of the above dose, if injectable (intramuscular) vitamin A needs to be given. Give same dose, on Day 0, 1 and 14 if there is clinical evidence of vitamin A deficiency.
Vitamin K deficiency or bleeding tendency	Inj Vitamin K 2.5 mg IM single dose
Zinc	<ul style="list-style-type: none"> 2 mg/kg/day for at least 2 weeks Give 0.2 ml/kg of 50% solution of magnesium sulphate IV single dose.
Folic acid deficiency	<ul style="list-style-type: none"> Give folic acid 5 mg on day 1 followed by 1 mg/day for at least 2 weeks.
Copper	<ul style="list-style-type: none"> 0.3 mg/kg/day (if separate preparation not available use commercial preparation).

Signs of improvement

During these seven days, a child with kwashiorkor will lose weight and a marasmic child gains little or nothing because the tissue gains are masked by excess body water loss.

Rehabilitative phase (2-6 weeks)

Aim: Restore normal weight for height.

Starting point: Child has started showing signs of recovery of appetite and change of expressions.

Table 19.10. Initiation of cure

Start feeding	<ul style="list-style-type: none"> Initiate feeds as early as possible. If oral feeding is not possible, give nasogastric feeding. Start with a lower volume of feed at frequent intervals; no. of feeds varying from 12 feeds on first and second day and 6 to 8 feeds on days 3-7. Ensure night feeds. If tolerated, milk-based diets are most suitable (80 kcal/kg/d) and protein (0.7 g/kg/d). The caloric intake should not exceed 100 kcal/kg/d on the first day.
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	<p>Increased gradually over one week to 150 kcal/kg/day of energy and 2-3 g/kg/d of proteins. Total amount of fluids should be 130 ml/kg/d.</p> <ul style="list-style-type: none"> Sugar and oil can be added to provide extra calories.
Lactose – intolerance (stool pH, 5.5 on two separate occasions)	<ul style="list-style-type: none"> Reduce the total lactose load in the diet by diluting the milk for 3 or 4 days or substituting a part of milk feeds by formulae based on lactose-free milk protein (calcium caseinate), sugar and oil, soyabean, meat or vegetable protein mixtures.
Other nutrients	<ul style="list-style-type: none"> Supplement the diet with minerals and trace elements as follows: Potassium chloride (1.2-2.4 g/L of feed), magnesium chloride (300-600 mg/L of feed), zinc acetate (20 mg per day), copper acetate (2 mg/L of feed), selenium (6-10 mcg/kg/day) and folic acid (1 mg per day). Do not give iron at this stage. Add iron only after a week of therapy. Vitamins of B complex group are not useful in initial therapy.
Intensive feeding (to recover lost weight)	<ul style="list-style-type: none"> Replace the initial milk diet with home diet as soon as possible. Provide therapeutic diet as follows: fluids 150 ml/kg/day, energy 175-200 kcal/kg/day, protein 2-4 g/kg/day. The diet prescribed for the child should be such, which the family can afford to provide for the baby within its limited income, can be easily cooked at home, does not perish easily, is culturally acceptable and easily available in the local market.

References

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- IAP Guidelines 2006 on Hospital Based Management of Severely malnourished children (Adapted from the WHO Guidelines). Indian Pediatrics 2007; 44: 443: 451.
- Facility Based IMNCI (F-IMNCI) Participants Manual. WHO, UNICEF, and Ministry of Health & Family Welfare, Government of India, 2009.

NUTRITIONAL RICKETS

Rickets is defective mineralization of growing skeleton caused by deficiency of vitamin D .

Clinical features

- Skeletal deformities like genu valgum/genu varum,

- Broadening of wrists,
- Susceptibility to fractures,
- Weakness, hypotonia and disturbances in growth.

Most often it is nutritional (lack of exposure to sunlight and inadequate dietary intake) and occurs between 2 months to 2 years of age. Radiological picture shows that epiphyseal growth plate is increased in thickness, cupped with hazy metaphyseal borders. Serum calcium is generally normal or low, phosphate is low or normal and alkaline phosphatase is raised in nutritional rickets.

Treatment

Nonpharmacological

Encourage the child to play outdoors/increase exposure to sunlight. Enhance dietary sources of vitamin D—dairy products, egg and fish liver oil.

Pharmacological

1. Vitamin D 600,000 IU Stat oral or IM (if patient is sick due to intercurrent infection). Repeat X-ray wrist after 4 weeks. If the response is positive, i.e. healing line of rickets is seen on X-ray, continue oral vitamin D 400 IU/day. If no response to therapy after 4 weeks refer to a higher centre for evaluation of non-nutritional rickets.
2. Calcium supplementation (elemental calcium) 1-3 years 700 mg/day; 4-8 years 1000 mg/day; 9-18 years 1300 mg/day

Reference

1. Rickets and Hypervitaminosis D. In: Nelson's Textbook of Paediatrics. Behrman RE, Kliegman RM, Jenson HB (eds), 19th Edition, WB Saunders Co, 2011; pp. 200-209.

PRIMARY NOCTURNAL ENURESIS

Causes

- Inappropriate toilet training
- Genetic,
- Sleep disorder,
- Reduced ADH at night.
- Psychological
- Organic pathology e.g obstructive uropathy
- UTI.

Clinical features

- Involuntary discharge of urine after the age at which bladder control should have been established (5 years).
- In primary nocturnal enuresis, child has never been dry at night while in secondary, child has been continent for at least 6 months before the child begins to wet again.

Treatment

Nonpharmacological (effective in 30% cases)

Rule out organic causes. Restrict fluid intake in the evening.

Bladder exercises:

- (i) Hold urine as long as possible during the day.

- (ii) Practice repeated starting and stopping the stream at the toilet bowl.

Practice getting up from bed and going to the bathroom at bedtime before sleep.

Pharmacological

Indicated only in children > 6 years where sufficient trial of nonpharmacological management has failed with following:

Tab. Imipramine: 6-8 year (25 mg), 9-12 year (50 mg), >12 year (75 mg) once a day at bedtime. Success rate 30-60%, relapse rate 90%.

Tab. Desmopressin 0.1-0.5 mg at bedtime.

If effective should be used for 3-6 months.

Refer the patient to a higher centre, if organic cause is suspected or when diagnosis is in doubt.

References

1. Current Paediatric Diagnosis and Treatment. Hay WW, Hayward AR, Levin MJ, et al (eds), 15th Edition, Lange Medical Books, New York, 2001; pp. 175-176.
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ACUTE BRONCHIOLITIS

Acute bronchiolitis is an acute respiratory tract infection caused commonly by *Respiratory syncytial* virus.

Clinical features

- Cold for 2-4 days followed by cough, wheeze and rapid respiration.
- Lower chest indrawing,
- Difficulty in feeding,
- Excessive crying due to hypoxaemia,
- Cyanosis and respiratory failure.

Investigations

- Normal or minimal increase in total leucocyte counts with relative lymphocytosis.
- X-ray chest may show hyperinflation and small atelectasis.

Treatment

Nonpharmacological

- For associated nasal block, normal saline drops in both nostrils as and when required, especially before feeds, and use of home remedies (ginger, honey, tulsi) for control of cough and plenty of liquids orally.
- For hospitalized patients, elevation at 30-40 degrees and neck slightly extended.

Pharmacological

Treatment of mild disease (ambulatory treatment at home)

No antibiotics.

Syr. Paracetamol 10-15 mg/kg 4-6 hourly for fever (for details see section on Fever in Chapter 1).

Hospitalize immediately, if any of the following develop:

- Chest indrawing,
- Poor feeding,
- Cyanosis,
- Altered sensorium
- Convulsions

If there is no improvement or deterioration at any time during the illness, the patient should be managed as severe disease.

Treatment of the severe disease (needs hospitalization for management)

1. Oxygen administration by oxygen hood or nasal catheter and intravenous fluids, if child is not able to feed.
2. Adrenaline inhalation (injectable form) 0.3 mg/kg by nebulizer after dissolving the solution in 3 ml saline; can be repeated every 4-6 hourly as required.
(No role of antibiotics, steroids, ribavirin inhalation in uncomplicated patients).
3. If adrenaline not available, Salbutamol inhalation (0.15 mg/kg dissolved in 3 ml soln) may be tried and continued, if response observed.
4. Syr. Paracetamol 10-15 mg/kg/dose may be given 4-6 hourly.

Do not use sedatives.

Monitor improvement in respiratory rate, lower chest indrawing, difficulty in feeding, excessive crying, cyanosis and oxygen saturation, if available, every 4-6 hours till there is significant improvement. If child does not improve/deteriorate, look for underlying heart disease, i.e. myocarditis/congenital heart disease and get an X-ray chest and look for massive collapse of lung/infection/pneumothorax, etc. and manage accordingly.

References

1. Bronchodilators for Bronchiolitis, 2, CD001266, Cochrane Database Syst Rev, 2000.
2. Prednisolone Treatment of Respiratory Syncytial Virus Infection: A Randomized Controlled Trial of 147 infants. Paediatrics, 1999; 104, 77.
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PNEUMONIA

Pneumonia is commonly caused by infectious agents, e.g. *Streptococcus pneumoniae*, *H. Influenza*

Clinical Features

- Fever,
- Cough with rapid breathing,

- Lower chest indrawing,
- Crepitations/wheezing,
- Difficulty in feeding
- Cyanosis.

On the basis of clinical features, pneumonia can be classified as mild to very severe disease.

No pneumonia—no fast breathing and no indicators of severe or very severe pneumonia.

Pneumonia—fast breathing, e.g

Age below 2 months >60 RR/min;
 2-12 months > 50 RR/min;
 12-60 months >40 RR/min

and no indicators of severe or very severe pneumonia; definite crackles on auscultation.

Severe pneumonia—lower chest indrawing or nasal flaring and no signs of very severe pneumonia.

Very severe pneumonia—central cyanosis or not able to breastfeed or drink or convulsions or lethargy or unconsciousness or severe respiratory distress (e.g. head nodding).

Treatment

Nonpharmacological

- Nasal block to be treated with saline nasal drops as and when required, especially before feeds.
- Ginger, honey, tulsi with warm beverages can be used as home remedies for cough.
- Patients with respiratory distress to be nursed in semi-reclined posture at angle of about 30°.
- Young infants should be nursed in comfortable position preferably in mother's lap.
- Breastfeeding and small frequent feeds to be continued in children who do not have severe or very severe pneumonia.

Pharmacological

Fever to be treated as in section on fever. Treatment is initiated according to the severity.

1. Pneumonia

Patients with age more than 2 months and with absence of features of severe/very severe pneumonia can be treated at home.

Tab./Syr. Amoxycillin 20-40 mg/kg/day in 3 divided doses for 5-7 days.

Or

Tab./Syr. Cephalexin 20-40 mg/kg/day in 3 divided doses for 5-7 days.

2. Severe pneumonia and very severe pneumonia or age <2 months treated as inpatients

1. Oxygen inhalation to maintain $\text{SaO}_2 \geq 92\%$. Continue with oxygen until the signs of hypoxia (such as severe lower chest wall in-drawing or breathing rate of $\geq 70/\text{min}$) are no longer present.
2. Give supportive care:
 - Ensure that the child receives daily maintenance fluids appropriate to child's age.

- Encourage breastfeeding and oral fluids, once the distress settles and the child is able to feed.
 - If the child has fever ($\geq 38.5^{\circ}\text{C}$) which appears to be causing distress, give oral Paracetamol (15 mg/kg/dose).
 - If wheeze is present, give a rapid-acting bronchodilator (as described in the next section).
 - Remove any thick secretions in the nose/throat, which the child cannot clear, by gentle suction.
3. Inj. Cefotaxime 100 mg/kg/day in 3 divided doses for 7-10 days.
- Or**
- Inj. Cefuroxime 100 mg/kg/day in 2 divided dose for 7-10 days.
- Or**
- Inj. Ampicillin 100 mg/kg/day in 3 divided doses Plus
- Inj. Gentamicin 7.5 mg/kg/day in 2-3 divided doses for 7-10 days.

3. *Severe pneumonia and very severe pneumonia with age >2 months treated as inpatients*

Admit the child in hospital.

Obtain a radiograph of the chest, if facilities are available for the same. Radiography in very severe pneumonia is required at admission to assess the extent of disease and to rule out presence of pneumothorax or effusion. In case of severe distress, stabilize and oxygenate the child before sending for radiograph. 1 and 2 as above

3. Inj. Ampicillin 50 mg/kg IM/IV every 6 hours plus Inj. Gentamicin 7.5 mg/kg IM/IV once a day. If the child responds well, discharge after 5 days to continue treatment at home with oral Amoxicillin 15 mg/kg per dose 3 times a day plus IM Gentamicin once daily for a further 5 days.

Or

Inj. Chloramphenicol 25 mg/kg IM or IV every 8 hours until the child has improved. Then continue the same drug orally in the same dose for 3 times a day for a total course of 10 days.

If the child does not improve by 48 hours to any one of these treatments, reassess for complications and switch to Inj. Ceftriaxone 80 mg/kg IM or IV once daily for 10 days.

High-risk patients, i.e. postmeasles, with congenital heart disease and severe malnutrition, etc. may be given Amoxycillin + Clavulanic acid, or Cefotaxime/ Cefuroxime as initial therapy.

Children who deteriorate rapidly, develop empyema/pneumothorax or have skin lesions suggestive of staphylococcal infection—should be treated with Inj. Cloxacillin 200 mg/kg/day in 3-4 divided doses + Inj. Gentamicin 7.5 mg/kg/day in 2-3 divided doses. When the child improves, continue Cloxacillin orally 4 times a day for a total course of 3 weeks at least. Children with complicated pneumonia (Empyema) need longer therapy for 4-6 weeks.

References

1. Facility Based IMNCI (F-IMNCI) Participants Manual. WHO, UNICEF, and Ministry of Health & Family Welfare, Government of India, 2009.
2. Diagnosis and Management of Pneumonia in Children. Paediatric Inf Dis J 2000; 19: 924-28.

THRUSH (ORAL CANDIDIASIS)

Oral candidiasis may be seen as early as 7-10 days of age (peak 4th week of life) uncommon after 12 months of age, when it is secondary to broad-spectrum antibiotic treatment. Chronic /recurrent oral candidiasis is seen in hypoparathyroidism, Addison's disease, autoimmune disorders, immunodeficiency, AIDS, myelosuppressive therapy and severe malnutrition.

Clinical Features

- Thick white patches on an erythematous base in the oral mucosa may spread to involve the lips, buccal mucosa, tongue and palate.
- Asymptomatic or may cause pain in the mouth, discomfort, anorexia and decreased feeding. Rarely may cause aspiration pneumonia.

Diagnosis is confirmed by the fact that on removing the plaques, punctate areas of bleeding are seen on the undersurface.

Treatment

Nonpharmacological

Correction of faulty sterilization technique of bottle; best to avoid bottle feeding.

Pharmacological

Nystatin (100,000 units/ml) oral suspension 1 ml applied to each side of mouth every 6 hours.

Or

Clotrimazole 1% cream, gel or lotion, oral application 3-4 times/day after feeding for 5-7 days (or 1-2 days beyond recovery).

Or

Miconazole gel 25 mg 4 times a day for 5-7 days.

Or

Gentian violet 1% aqueous solution 1-2 times a day, for 5-7 days (can stain tissues and clothes).

In resistant/chronic cases (patients with major underlying disease)

Tab. Fluconazole 3-6 mg/kg once daily for 5-7 days.

Or

Tab. Ketoconazole 3-6 mg/kg once daily for 5-7 days.

Warning

Resistant/recurrent/chronic thrush in a child with no obvious predisposing factor/source of infection look for underlying endocrinopathy/immune disorder, AIDS and malnutrition.

References

1. Treatment of Oropharyngeal Candidiasis in Neonates. Review and Appraisal. Paediatric Inf Dis J 1997; 16(9), 885-894.
2. Mycotic Infection. In: Text Book of Paediatrics. Martin Wesse, Stephne C. Aronoff (edd), pp. 933-934.

CONSTIPATION

Constipation is defined as the passage of hard stools that are difficult to pass irrespective of frequency. May result from

- An inadequate milk intake,
- Hunger stools,
- Use of over-strength artificial feeds and low roughage diet
- Imperforate anus,
- Meconium plug,
- Low intestinal obstruction,
- Neonatal small colon syndrome,
- Hirschsprung's disease,
- Cystic fibrosis
- Hypothyroidism
- Idiopathic.

Clinical Features

- Fretfulness, poor appetite, intermittent abdominal pain, distension. Retentive posturing occurs with urge to defaecate, relieved after going to the toilet, overflow soilage may appear.
- There may be history of recurrent UTI. Weight gain may be impaired.
- On examination, there is faecal soiling of under wear and persistent faecal odour. Abdomen is often distended and tympanic to percussion. Faecal masses palpable above pubis and in left colon, rarely entire colon is filled with firm mass; on rectal examination, hard stools are palpable in ampulla.

Treatment

Nonpharmacological

- Dietary modification: Ensure adequate fluid intake in diet. In infants, breast milk should continue as it is less likely to be constipating than cow's milk, can add extra sugar in cow's milk, if child is not breastfed.
- Add fibre by cereals (wheat bran, oat, corn), pulses, vegetables, salads and fruits and isabgol.
- Behavioural modification.
- Toilet training to achieve regular evacuation. Child is instructed to use bathroom after breakfast or dinner, to take advantage of meal stimulated increase in colonic motility.
- Maintain calendar to record stooling.
- Positive reinforcement (reward/appreciation) for successful toileting (no punishment for failure).

Pharmacological

1. Agarol or Lactulose in infants 2.5-10 ml/day; children 40-90 ml/day in 3-4 divided doses.

Or

Mineral oil (Liquid paraffin) 5-15 ml/kg/day.

Or

Milk of Magnesia 0.5-3 ml/kg/day. Dose is titrated to produce at least one stool/ day.

Medical management has to be with different group of laxatives added serially to maxima doses and maintained for a considerable length of time (3-6 months) and then tapere gradually. Commonest cause of failure is short-term treatment and suboptimal doses.

2. Enemas may be used in severe cases where sufficient trial of medical therapy has failed.

Hypertonic Phosphate (5-6 ml/kg) or Glycerine saline (1 ml/kg). Pure saline enemas are less effective and plain tap water/soap water enemas are not used in children. Suppositories of Glycerine/Bisacodyl may also be used. To empty the bowel of faecoliths, enemas may be required daily or on alternate days for initial few days.

In severe cases with faecal soiling, in the initial stages: bowel cleaning/disimpaction may be required with enemas 1-2/day or suppositories 1-2/day.

In very severe cases with multiple faecoliths, failed medical treatment, mental retardation, etc., surgical disimpaction may be done.

References

1. Diarrhoea and Constipation. Harrison's Principles of Internal Medicine. Kasper DL, Braunwald E, Fauci AS et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp 308- 319.
2. Major Symptoms and Signs of Digestive Tract Disorders. In: Nelson's Textbook of Paediatrics. Behrman RE, Kliegman RM, Jenson HB (eds), 19th Edition, WB Saunders Co, 2011; pp 1240- 1249.
3. Approach to Patient with Constipation. In: Text book of Gastroenterology. Yamada T, Alpers PH, Laine L et al (eds), Lippincott Williams and Wilkins, Philadelphia, 1999; pp. 910-926.
4. Acquired Constipation in Children. Treatment Protocol. In: Recent Advances in Paediatric Clinical Gastroenterology. BR Thapa (ed), Relume Printec, Chandigarh, 2001; pp. 170-180.
5. Facility Based IMNCI (F-IMNCI) Participants Manual. WHO, UNICEF, and Ministry of Health & Family Welfare, Government of India, 2009.

(See also Constipation in Chapter 6)

ACUTE DIARRHOEA

Acute diarrhoea is caused commonly by *rotavirus*, *E. coli*, *V. cholerae*, *Giardia* or parenteral infections and invasive diarrhea by *Shigella*, *Salmonella* and *E. histolytica*.

Clinical Features

- Frequent stools,
- Vomiting,
- Fever
- Dehydration.
- Dysentery - *Shigella*, *Salmonella*, *E. coli*, *C. jejuni*, *E. histolytica*.

Investigations in acute diarrhoea which may be if indications exist (Table 19.13).

Every case of diarrhea does not require investigations ,they are to be done in specific indication

Table 19.13 Investigations in acute diarrhoea

Investigations	Indications
Stool microscopy	Dehydration or high fever, diarrhoea persisting beyond 7 days, Blood persisting in stool after 48 hour of treatment
Blood urea, S. electrolytes (SE) and arterial blood gas (ABG)	All 3 investigations in moderate to severe dehydration, SE in persistent vomiting or signs of dyselectrolytaemia; ABG in respiratory distress with no chest signs and sepsis (correct it only if pH <7.25).
Infection screening by TLC, DLC, band cell count, ESR and CRP	Fever persisting >72 hours, PEM > grade III or age <3 months.
Blood culture	Suspected sepsis, before starting antibiotics
Chest X-ray, CSF and others	As and when required
Stool culture	No role

Treatment**Nonpharmacological**

- Maintain hydration by home available fluids (HAF) in place of or along with ORS and water. These are rice, kanji, butter milk, dal soup, coconut water or weak tea, etc. Soft drinks, sweetened fruit drinks and tea are unsuitable and could be potentially dangerous.
- Maintain nutrition: Continue breastfeeding. Continue normal light diet, e.g. khichri, dalia, banana or mashed dal, etc. Do not dilute or stop milk as there is not much role of lactose intolerance or milk protein allergy. Give extra food during recovery.
- Teach the mother to recognize danger signs and return immediately.

Pharmacological

1. Low osmolarity oral rehydration solution (ORS) in some dehydration 75 ml/kg in 4 hours under observation.

After 4 hours, if dehydration is corrected, or if child was not dehydrated at presentation, send home with instructions to give ORS in 2:1 dilution as accepted by the child. Asked to report back, if vomiting persists or urine is not passed for >8 hours. As a rough guideline 10 ml/kg of ORS may be added for each large stool.

If dehydration is not corrected after 4 hours, same amount of ORS may be repeated in next 4 hours and if dehydration is corrected, send home.

If dehydration does not improve in 8 hours or if it worsens abandon, oral rehydration therapy (ORT) and give IV fluids.
2. Zinc sulphate to be supplemented in all cases of diarrhea for 14 days- 10 mg/day of elemental zinc in children below 6 months of age and 20 mg/day of elemental zinc above 6 months of age.

Principles of Oral Rehydration Therapy (ORT)

- Give in small sips.
- Vomiting is not a contraindication unless persistent.
- Contraindicated in altered sensorium or paralytic ileus.

- Stop as soon as diarrhoea stops.

2. In severe dehydration (without severe acute malnutrition)

Rapid IV rehydration immediately with close monitoring, followed by oral rehydration once the child starts to improve sufficiently. If the child can drink, give ORS (5 ml/kg/ hr) by mouth while the drip is set up.

For management of severe dehydration with severe acute malnutrition see section PEM.

Note: Ringer's lactate solution is the preferred IV solution. If it is not available, normal saline can be used. 5% dextrose solution is not effective and should not be used.

In addition, all patients should start to receive ORS solution at the rate of 5 ml/kg/h when they can drink.

Give 100 ml/kg Ringer's lactate solution (or if not available, normal saline), divided as follows:

Age	First give 30 ml/kg in	Then give 70 ml/kg in
Infants (under 12 months)	1 hour*	5 hours
Children (12 months up to 5 years)	30 minutes*	2 ^{1/2} hours

* Repeat once if radial pulse is still very weak or not detectable.

Reassess the child every 15-30 minutes. If hydration status is not improving, give the IV drip more rapidly.

Also give ORS (about 5 ml/kg/h) as soon as the child can drink: usually after 3-4 h (infants) or 1-2 h (children).

If IV treatment not possible, give ORS 20 ml/kg/h for 6 h (120 ml/kg) by nasogastric (NG) tube.

Assess an infant after 3 h and a child after 6 h. Classify dehydration again. Then choose the appropriate plan (A, B, or C) to continue treatment.

Give oral antibiotic for cholera, if child 2 years or older.

If possible, observe the child for at least 6 h after rehydration to be sure that the mother can maintain hydration by giving the child ORS solution by mouth.

If child presents in Shock—push 20 ml/kg of Ringer's lactate or normal saline over 15 minutes and repeat twice more, if shock persists, use central venous pressure monitoring for further management if shock present after pushing 60 ml/kg. (For details see section on Shock in Chapter 2).

3. Tablet Zinc Sulphate (up to 6 months 10 mg; > 6 months 20 mg for 14 days)

Specific therapy, if indicated

Frank blood and mucus in the stool or >10 pus cells/hpf

Syr. Nalidixic acid 55 mg/kg/day in 3 divided doses for 5 days

Or

Syr. Cefixime 10-15 mg/kg/day in 2 divided doses (*Shigella* strains are largely resistant to ampicillin and cotrimoxazole) for 5 days.

Indications for admission are: Children with severe malnutrition and dysentery and children who are toxic, lethargic, have abdominal distension and tenderness or convulsions.

Inj. Ceftriaxone 100 mg/kg IM/IV once daily for 5 days may be used.

Ensure a good diet as dysentery has a marked adverse effect on nutritional status.

Giardiasis (only if trophozoites are seen on stool microscopy)

Syr. Metronidazole 15 mg/kg/day in 3 divided doses for 5 days

Or

Syr. Tinidazole 50 mg/kg/day single dose (maximum 2 g) with food

Amoebic dysentery

Young children should not be routinely treated for amoebiasis, as it is an infrequent cause of bloody diarrhoea in children. Amoebiasis should be considered only if two different antibiotics usually effective for *Shigella* have been given sequentially without showing signs of clinical improvement, or if a microscopic examination of fresh stool done in a reliable laboratory shows trophozoites of *E. histolytica* containing RBCs.

Amoebic dysentery should be treated with metronidazole or tinidazole as above for 5-10 days.

Cholera (suspect in any child with severe watery diarrhoea)

Mainstay of treatment is fluid therapy and following antibiotic may be used to prevent spread:

Syr. Doxycycline 5 mg/kg (max 200 mg) in single dose.

Or

Syr. Cotrimoxazole (TMP) 8 mg/kg/day in 2 divided doses for 5 days.

Or

Syr. Erythromycin 30 mg/kg/day for 3 days.

Parenteral infections to be treated by appropriate antibiotics. There is not much role of antiemetics in a child with vomiting. Rule out meningitis, URI and dyselectrolytaemia and give ORS in sips. If vomiting persists give intravenous fluids.

However, occasionally 1 or 2 doses of Metoclopramide (0.5 mg/kg) or Domperidone

(0.5 mg/kg) may be tried before giving intravenous fluids. ***Binding agents, e.g. Kaolin pectin, etc. are not useful.***

Following drugs are contraindicated

1. Antimotility agents, e.g. loperamide, diphenoxylate, etc.
2. Antisecretory agents, e.g. salicylates, etc.

Not enough evidence on either safety and efficacy of Racedotril and Probiotics.

Monitoring

Keep record of vitals, e.g. pulse, BP, capillary filling time (CFT), respiratory rate (1 hourly) and temperature (6 hourly). Monitor for improvement or worsening of signs of dehydration. Record urine output and stool frequency and consistency.

Modifications or step up treatment

Admit, if PEM grade III or age <3 months (as higher chances of complications, e.g. shock, hypoglycaemia, etc.), anxious mother, associated severe systemic infections, e.g. septicaemia, meningitis or pneumonia.

Investigate for lactose intolerance, incipient infections, e.g. urinary tract infection (UTI) or rare gut organisms, if diarrhoea persists for >7 days.

Exclude parenchymal renal failure, if child has not passed urine after hydration.

Give a fluid challenge (20 ml/kg of normal saline) followed by frusemide injection (1-2 mg/kg). If urine is still not passed, then parenchymal renal failure considered and managed accordingly.

References

1. IAP Guidelines on Management of Acute Diarrhoea. 2006.
2. Major Symptoms and Signs of Digestive Tract Disorders. In: Nelson's Textbook of Paediatrics. Behrman RE, Kliegman RM, Jenson HB (eds), 19th Edition, WB Saunders Co, 2011; pp. 1240-1248.
3. Facility Based IMNCI (F-IMNCI) Participants Manual. WHO, UNICEF, and Ministry of Health & Family Welfare, Government of India, 2009.

ACUTE VIRAL HEPATITIS

Acute viral hepatitis is a systemic infection affecting liver and is caused by a number of viruses like Hepatitis A, B, C, D, E viruses, etc.

Clinical Features

- Asymptomatic infection,
- Anicteric hepatitis to icterus,
- Hepatic coma.
- Prodrome - fever, malaise, nausea, emesis, anorexia and abdominal discomfort

LFTs may be done only if the course of disease is unusual or when obstructive jaundice is suspected.

Treatment

Nonpharmacological

- Rest if the patient feels exhausted or fatigued (forced rest does not help and does not shorten the time to recovery).
- Regular small frequent meals with high caloric content. High carbohydrate diets are acceptable but should be hygienic. Traditionally sugarcane juice is used as home therapy though it has no established benefit.
- Maintain adequate hydration in case of vomiting and avoid fatty meals.

Pharmacological

There is no specific treatment for simple acute viral hepatitis. Uncomplicated cases can be treated at home.

If patient has frequent vomiting Syr./Tab. Metoclopramide 0.1 mg/kg/dose can be given as and when required but not to be repeated before 6 hours.

Usually fever abates after jaundice appears. Occasionally, if the situation requires, paracetamol may be used sparingly (see section on Fever in Chapter 1).

Persistent high grade fever suggests alternative diagnosis. Hospitalization required only in clinically severe illness, e.g. alteration in sleep pattern, altered behaviour,

abnormal movements, persistent vomiting, dehydration, decreased urinary output, bleeding from any site or any other complication.

References

1. Viral Hepatitis. In: Nelson's Textbook of Paediatrics. Behrman RE, Kliegman RM, Jenson HB (eds), 19th Edition, WB Saunders Co, 2011; pp. 1393-1404.

2. Acute Viral Hepatitis. In: Harrison's Principles of Internal Medicine. Fauci, Kasper, Braunwald, et al (eds), 18th Edition, McGraw Hill Company Inc: New York, 2012; pp. 2537-2866.

(See also Jaundice and Acute Viral Hepatitis in Adults in Chapter 1).

CHICKENPOX OR VARICELLA

Varicella is the primary infection caused by Varicella-zoster virus. It is highly infectious and is transmitted by droplet infection. The incubation period is about 14 days.

Clinical Features

- Begins as crops of small red papules over the trunk appearing within 1 day of fever and systemic symptoms which quickly develop into clear, often oval vesicles on a erythematous base. Contents become cloudy in about 24 hours and than scab. Many such crops may appear for 3-4 days.
- Bacterial superinfection, thrombocytopenia, arthritis, hepatitis, encephalitis or meningitis can complicate the disease.
- The disease is severe in adolescents and adults as well as immune compromised individual. Reactivation disease results in herpes zoster or shingles (for details see Skin section in Chapter 14).

Treatment

Nonpharmacological

Itching is bothersome and scratching effect may be minimized by making the patient wear mittens, daily change of clothes and good personal hygiene may decrease the risk of secondary infection.

Pharmacological symptomatic therapy

1. For management of fever (see section on Fever), Aspirin and other salicylates are contraindicated due to risk of Reye's syndrome and should not be used.
2. Local anti-pruritic agents like Calamine lotion may alleviate itching. If itching is not relieved with above,

Tab. Pheniramine 25 mg 2 times a day.

In children: Syr. 0.5 mg/kg/day every 8 hours

Or

Tab. Cetirizine 10 mg once a day

In children (2-6 years): 5 mg; (>6 years) 10 mg once a day.

3. In case of immuno-compromised children on long-term treatment with steroids, those on anti-cancer drugs or other immunosuppressive therapy, HIV positive patients, children older than 12 years of age, those with chronic cutaneous or pulmonary disorders who are at increased risk of severe disease, oral acyclovir if started within few hours (<24 h) of the onset of rash may decrease the duration, magnitude of fever as well as the number of skin lesions.

Tab. Acyclovir 20 mg/kg/ day is given 6 hourly for 5 days.

In case the patient is severely immuno-compromised, viral encephalitis or severe disease in adults, Inj. Acyclovir should be started as soon as possible in all cases at the dose of 10 mg/kg 8 hourly IV for 7 days.

Acyclovir not recommended routinely for a healthy child.

Assessment of response to therapy

Most cases will stop having fever after the initial 3-4 days when new crops of vesicle stop appearing. The vesicles normally heal by scabbing in about a week's time.

Persistence of fever may suggest secondary infection.

The disease can be complicated by: secondary bacterial infection of skin lesion, thrombocytopenia, pneumonia—particularly in adolescents and adults, Reye's syndrome, postinfectious encephalitis and if any of these develop, should be treated appropriately.

References

1. Cutaneous Manifestations of Systemic Infections. In: Text Book of Paediatric Infectious Diseases. Feigin RD, Cherry JD (eds), 4th Edition, WB Saunders Co. Philadelphia, 1998; pp. 713-737.
2. American Academy of Paediatrics. In: Report of the Committee on Infectious Diseases, 25th Edition, Elk Grove Village, Illinois, US, 2000.
3. Varicella-Zoster Virus. In: Nelson's Textbook of Paediatrics. Behrman RE, Kliegman RM, Jenson HB (eds), 19th Edition, WB Saunders Co, 2011; pp. 1104-1110.
4. Viral Infections. In: Textbook of Dermatology. Champion RH et al (eds), 6th Edition, Blackwell Science Ltd., pp. 1015.
5. Varicella and Herpes Zoster. In: Dermatology in General Medicine. Fitzpatrick TB et al (eds), 5th Edition, the McGraw Hill Company Inc., New York, pp. 2427.

MEASLES

Measles is an acute viral disease of childhood, associated with high rates of morbidity and mortality.

Clinical Features

- Fever, cough, coryza, conjunctivitis, an erythematous maculopapular rash appearing on the 4th day of the illness, and a pathognomonic enanthem (Koplik spots) characterize it.
- Rash starts from behind the ears, along the hairline, involve the face and then the trunk and the limbs.
- Fever usually subsides after the appearance of the rash unless there is some complications such as otitis media, bronchopneumonia, laryngotracheobronchitis (croup), and diarrhoea. Acute encephalitis, which frequently results in permanent brain damage, occurs in approximately 1 in every 1000 cases.
- Another cause of persistence of fever could be flaring up of Koch's.

Treatment

Nonpharmacological

- The patient should be isolated from other susceptible individuals particularly unimmunized children for at least four days after the appearance of the rash.
- Bed rest is usually required and cold sponging may be required for febrile patients.
- Small frequent feeds and plenty of oral fluids should be continued.

Pharmacological

No specific antiviral treatment is available.

1. Fever is managed with oral Paracetamol (see the section on Fever in Chapter 1).
2. If there is persistent coryza or nasal itching which is disturbing the child, oral Symp. Promethazine 1 mg/kg/day in 3-4 divided doses can be used.

Treatment of other co-existing problems

1. Inj. Vitamin A 100,000 IU is given intramuscularly for 2 consecutive days or else high dose oil based preparations containing 50,000 units per ml may be given. A third dose may be given 4 weeks later particularly if there are manifesting signs of vitamin A deficiency.
2. Treat appropriately secondary bacterial infection like bronchopneumonia and/or gastrointestinal infection.

References

1. Measles Virus. In: Text Book of Paediatric Infectious Diseases. Feigin and Cherry (eds.), 4th Edition, WB Saunders Co. Philadelphia, 1998; pp. 2054-2074.
2. American Academy of Paediatrics. In: Report of the Committee on Infectious Diseases, 25th Edition, Elk Grove Village, Illinois, US.
3. Measles. In: Nelson's Textbook of Paediatrics. Behrman RE, Kliegman RM, Jenson HB (eds), 19th Edition, WB Saunders Co, 2011; pp. 1069-1075.

MUMPS

Mumps is a disease caused by a virus that can infect many parts of the body, especially the parotid salivary glands.

Clinical Features

- Parotid glands become increasingly swollen and painful over a period of one to three days.
- Fever of up to 103°F (39.4°C), with headache and loss of appetite.
- Mumps can also involve the brain, pancreas and other organs.

Meningoencephalitis is the commonest complication (250/100 000 cases). Other complications are orchitis, epididymitis, oophoritis, pancreatitis, thyroiditis, Myocarditis, deafness, optic neuritis and arthritis.

Treatment

Nonpharmacological

- Child should be encouraged to drink plenty of fluids. Water, decaffeinated soft drinks and tea are better tolerated than acidic fruit juices (like orange juice, grape fruit juice or lemonade) that make parotid pain worse.
- Either warm or cold packs, whichever feels better, may be used to soothe the swollen parotid glands.

Pharmacological

Most cases are treated symptomatically on OPD basis.

Fever when troublesome may be brought down using non-aspirin fever medications such as Paracetamol (10-15 mg/kg/day SOS or every 4-6 hours). These medicines will also help relieve pain in the swollen parotid glands.

(Caution: Aspirin is contraindicated in children with viral illnesses due to risk of Reye's syndrome).

Being a viral illness, antibiotics have no role. There is no specific therapy available.

Patients with abdominal pain, testicular swellings or signs of raised intracranial tension need to be admitted in the hospital.

References

1. Text Book of Paediatric Infectious Diseases, WB Saunders Co. Philadelphia.
2. American Academy of Paediatrics. In: Report of the Committee on Infectious Diseases, 25th Edition, Elk Grove Village, Illinois, US, 2000.
3. Mumps. In: Nelson's Textbook of Paediatrics. Behrman RE, Kliegman RM, Jenson HB (eds), 19th Edition, WB Saunders Co, 2011; pp. 1078-1081.

ACUTE FLACCID PARALYSIS (AFP)

A case of AFP is defined as any child aged <15 years, with acute onset of flaccid paralysis without any obvious cause (e.g. severe trauma or electrolyte imbalance like hypokalaemia). AFP is a notifiable disease and all cases must be reported immediately to Nodal Officer and District Surveillance Officer, NPSP Unit, Directorate of Family Welfare. India has shifted to the virological system of case classification, i.e. within 90 days of paralysis onset, all cases should undergo final classification as confirmed polio, non-polio AFP or compatible with poliomyelitis. India has been declared polio free for last 2 years.

Clinical Features

The paralysis is of acute onset (<4 weeks) and the affected limb(s) are flaccid (floppy or limp). If the AFP is due to polio, then sensation is never affected. Other important differentials to be considered in cases with AFP are detailed in Table 19.14. This includes possible illness due to Guillian-Barre syndrome, transverse myelitis, traumatic neuritis, viral infections caused by other enteroviruses, toxins and tumours. Isolated facial paralysis is not included.

Pseudoparalysis due to pain in congenital syphilis, osteomyelitis, abscess, scurvy, unrecognized trauma leading to contusions, slipped epiphysis or fractures, etc. can also mimic AFP.

Treatment for acute POLIO like illness

All cases should be treated as below except patients with isolated single lower limb involvement and reporting after 4 days of onset of paralysis and currently not progressing for more than 48 hours.

Nonpharmacological

- Complete bed rest and correct positioning of the affected limbs in the optimal position as follows:
- Hip-slight flexion, knee- 5° flexion, foot- 90° with support against the soles. Both legs should be supported from the lateral sides with pillows or rolled towels or salt/ sand packs to prevent rotation. When pain subsides, passive movements of the joints for about 10 minutes, 2-3 times a day.
- Warm water fomentation using hot packs with soaked towels wrapped around the affected parts for about 10 minutes, 2-3 times a day help in relieving pain.
- If transient urinary retention occurs, alternate hot and cold compresses over the suprapubic region.

(**Caution:** No massage or intramuscular injections as it may further precipitate paralysis. Watch for progression, particularly for the involvement of the respiratory muscles.)

Pharmacological

There is no specific drug therapy for polio. For fever and pain, use paracetamol or ibuprofen (see section on Fever in Chapter 1). Referral to a tertiary care centre with a ventilatory support facility, if there is progression of paralysis, respiratory distress, bulbar involvement, paralysis of upper limbs which is <3 days old (there is higher risk of diaphragmatic involvement in such cases), marked drowsiness or any other complication.

Note: Post-polio residual paralysis should be referred for rehabilitative services to an appropriate centre.

References

1. Surveillance of Acute Flaccid Paralysis. Field Guide, 3rd Edition, Child Health Division, Department of Family Welfare, Ministry of Health and Family Welfare, 2005.
2. Enteroviruses. In: Nelson's Textbook of Paediatrics. Behrman RE, Kliegman RM, Jenson HB (eds), 19th Edition, WB Saunders Co, 2011; pp 1088-1094.

Table 19.11 Important differential diagnosis of APP (adapted from Field Guide, MOHFW,GOI)

Signs and symptoms	Polio	GBS	Transverse myelitis	Traumatic or injection neuritis
Age	Most cases occur under 3 years of age	Usually above 2 years of age	Mostly above 4 years of age	No age limit
Progression of paralysis	24-48 h onset to full paralysis	Hours to days	Hours to 4 days	Hours to 4 days
Fever onset	High always present at onset of flaccid paralysis disappears the following day	Not common	Rare	Commonly present before, during and after paralysis
Flaccidity	Acute, asymmetrical, proximal	Acute, symmetrical, distal	Acute Lower limbs symmetrical	Acute, asymmetrical limb
Muscle tone	Diminished	Diminished	Diminished in lower limbs	Diminished in affected limb
Deep Tendon Reflexes	Decreased or absent	Absent	Absent in lower extremities, later hyper-reflexia	Decreased or absent
Sensation	Severe myalgia but no sensory deficit	Cramps, tingling hypoanaesthesia of palms and soles	Anaesthesia of the lower limbs with sensory loss	Pain in gluteal region
Cranial nerve	Only in bulbar or bulbospinal cases. Loss of gag reflex most common	Often present affecting VII, IX, X, XI, XII	Absent	Absent

Signs and symptoms	Polio	GBS	Transverse myelitis	Traumatic or injection neuritis
Respiratory insufficiency	Only when bulbar and bulbospinal involving respiratory muscles	In severe cases	Sometimes	Absent
CSF WBCs proteins	High WBCs. Normal or slightly increased	<10 High	Normal Normal or slightly elevated	Normal Normal
Bladder dysfunction	Absent	Transient	Present	Never
Nerve conduction velocity in 3rd week	Abnormal, anterior horn cell disease	Abnormal, demyelination	Normal or abnormal has no diagnostic value	Abnormal in sciatic nerve
EMG 3rd week	Abnormal	Normal	Normal	Normal
Sequelae at 3 months and up to a year	Severe asymmetrical atrophy, skeletal deformities may develop later	Symmetrical atrophy of distal muscles, diplegia, atrophy after years	Flaccid	Moderate atrophy only in affected lower limb

An AFP case is “confirmed” as polio only by the isolation of wild poliovirus from any stool specimen.

An AFP case is classified as “non-polio AFP” if wild poliovirus is not isolated from adequate stool* specimens. If stool specimens are inadequate, final classification of the AFP case as either nonpolio AFP or compatible with polio will depend on the results of 60 days follow-up examination. If the 60 days follow-up examination shows no residual weakness, the case is classified as non-polio AFP. The final classification of the case as “compatible” or discarded as “non-polio AFP” is determined by the National Expert Review Committee (ERC) which meets every month in New Delhi to review all such cases.

* Adequate stool: Two specimens collected within 14 days of paralysis onset and at least 24 hours apart; each specimen must be of adequate volume (8-10 grams) and arrive at a WHO-accredited laboratory in good condition (i.e., no desiccation, no leakage, with adequate documentation and evidence that the cold chain was maintained)

PERTUSSIS (WHOOING COUGH)

This results from *Bordetella pertussis* infection leads to this respiratory disorder which can have long-term poor effects on health.

Clinical features

Beginning as a mild upper respiratory tract infection (catarrhal stage), can progress to severe paroxysms of cough, often with a characteristic whoop, followed by vomiting.

The child runs out of breath with bulging eyes, flushed face, lacrimation, salivation, protrusion of tongue and distension of the neck veins, etc. Such episodes are exhausting and precipitated by yawning, sneezing, eating or even suggestion.

Treatment

Pharmacological

1. Syr./Tab. Erythromycin, 40-50 mg/kg/day in 4 divided doses orally for 14 days initiated early in the coryzal phase of the disease, i.e. first 14 days of the illness may shorten the course of whooping cough, which otherwise may last for weeks or months. Later once the paroxysms start, no antimicrobial have any benefit except for eradication of any secondary pulmonary infection.
2. In patients with severe coughing paroxysms, salbutamol 1-2 mg/kg/day in 3-4 divided doses for a week or so may be tried.
3. Severe cases particularly those <6 months of age and those with respiratory distress need to be admitted for intravenous fluids and oxygen therapy.

Supportive therapy

Oxygen therapy is required in severe cases with respiratory distress.

Hydration should be maintained with intravenous or oral fluids in adequate amounts (cough suppressants are usually not helpful).

References

1. American Academy of Paediatrics. In: Report of the Committee on Infectious Diseases, 25th Edition, Elk Grove Village, Illinois, US.
2. Pertussis (Bordetella pertussis and B. parapertussis). In: Nelson's Textbook of Paediatrics. Behrman RE, Kliegman RM, Jenson HB (eds), 19th Edition, WB Saunders Co, 2011; pp. 944-948.

CARDIAC FAILURE

Cardiac failure is defined as a state in which the heart cannot deliver an adequate cardiac output to meet the metabolic needs of the body.

Common causes according to age of presentation are:

- Neonate—severe anaemia, heart block, congenital heart disease, e.g. hypoplastic left heart, coarctation, left to right shunt and large mixing cardiac defects.
- Infant—left to right shunt, supraventricular tachycardia.
- Children—rheumatic fever, myocarditis, cardiomyopathy, acute hypertension e.g., acute glomerulonephritis.

Clinical features

- Exertional dyspnoea,
- Poor weight gain,
- Feeding difficulties,
- Breathes too fast and better when upright,
- Persistent cough and wheezing,
- Excessive perspiration and irritability,

- Puffiness of face and pedal oedema.
- Tachypnoea, tachycardia, small volume pulse,
- Peripheral cyanosis,
- Pedal/facial/sacral oedema,
- Hepatomegaly, raised JVP (appreciated well in older children),
- Gallop rhythm,
- Cardiomegaly and failure to thrive.

Treatment

Identify and treat the underlying cause.

Nonpharmacological

- Restricted activity and bed rest with upright posture depending on cardiac reserve.
- In severe CHF, dietary modifications in infants by increasing calories per feed.
- Breastfeed supplementation, nasogastric feed to avoid the exertion of active feeding.
- No added salt in diet and fluid restriction. Monitor weight and fluid balance (input/output) charting.
- Cold sponging in case of fever.

Pharmacological

Treat anaemia with iron and/or packed cells as and when indicated. Algorithm for treatment is shown in Fig. 19.3.

1. Elixir/Tab. Digoxin (Elixir 0.25 mg/5 ml, Tab. 0.25 mg)

Method of digitalization. $0.5 \times$ digitalization dose initially, $0.25 \times$ digitalizing dose 8 and 16 hours later.

Digitalizing dose. Newborn = IV, IM: 0.010-0.030 mg/kg divided or orally: 0.040 mg/kg divided in fractions.

Infants = IV, IM 0.030-0.040 mg/kg or orally 0.050 mg/kg in fractions.

Children = IV, IM, PO: 0.010-0.015 mg/kg in fractions.

For maintenance. Begin maintenance dosage 24 hours after 1st fraction of digitalizing dose. Newborn = PO: 0.005-0.010 mg/kg/24 hours, divided every 12 hours. In infants and children, orally 0.002-0.005 mg/kg/24 hours divided every 12 hours.

(Caution: Avoid hypokalaemia during therapy with digoxin)

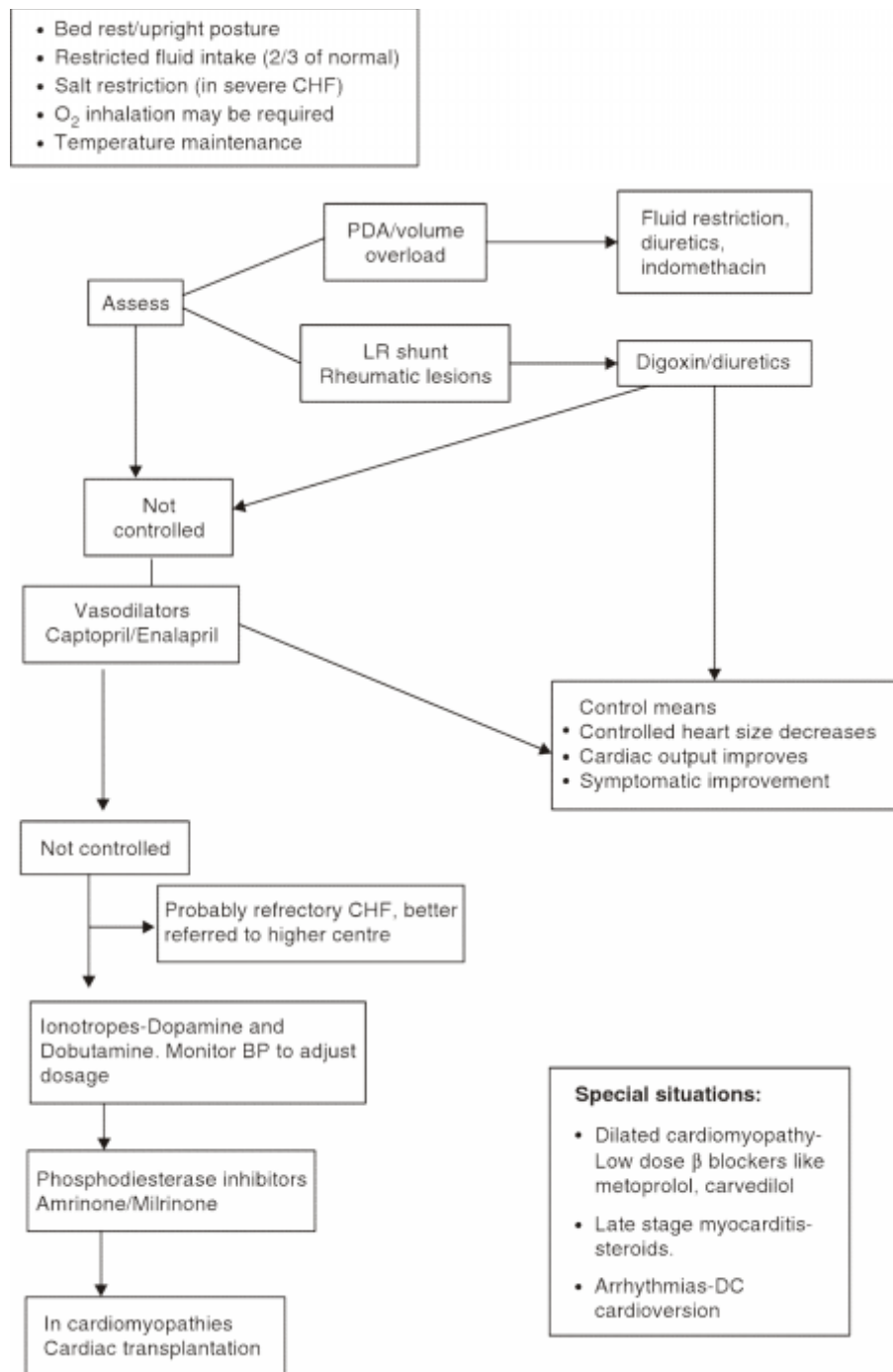


Fig. 19.4. Algorithm for treatment of congestive heart failure

2. Tab. Frusemide 0.5-2 mg/kg every 12 hourly (may need K supplement).
Or

Tab. Chlorothiazide 20-50 mg/kg/day in 2 divided doses.

Or

Tab. Spironolactone 1-3 mg/kg/day in 2 divided doses.

3. In cases with regurgitant cardiac lesions like severe MR where reduction in after load is required

Tab. Captopril 0.25 test dose build up doses from 1.5 mg/kg/day to 3 mg mg/kg/ day in 3 divided doses.

Or

Tab. Enalapril 0.08-0.5 mg/kg/dose 12-24 hourly (maximum 1 mg/kg/day).

4. Patients with hypotension and low cardiac output should be referred to a higher centre) for Inj. Dopamine infusion (40 mg/ml) 2-20 mcg/kg/min prepared in normal saline or 5% dextrose. Hypovolaemia should be corrected before infusion is started and BP is monitored during the infusion.

Or

Inj. Dobutamine infusion (250 mg/5 ml) 2-20 mcg/kg/min. Both the drugs can be used simultaneously to have added response because of different mechanism of actions.

Or

Inj. Milrenone 0.5 mcg/kg/min infusion.

Refer for surgery in case of severe mitral regurgitation due to chordal rupture leading to refractory CHF.

References

1. Heart Failure. In: Nelson's Textbook of Paediatrics. Behrman RE, Kliegman RM, Jenson H (eds), 19th Edition, WB Saunders Co, 2011; pp 1638.
2. Consensus Guidelines on Pediatric Acute Rheumatic Fever and Rheumatic Heart Disease Working Group on Pediatric Acute Rheumatic Fever and Cardiology Chapter of Indian Academy of Pediatrics. Indian pediatrics 2008; 45: 565-573.

(See also Congestive Heart Failure in Chapter 3)

DIABETES MELLITUS (DM)

Most of the cases of DM in children are of insulin dependent diabetes mellitus (Type 1) and have hyperglycaemia with glucosuria.

Clinical Features

- While some cases present with classical symptoms of polyphagia, polydipsia, polyuria and weight loss, many children at the onset present in the state of diabetic ketoacidosis (DKA).
- A minority of cases, while asymptomatic are detected to have glucosuria and hyperglycaemia.
- Diagnosis of DM is made by demonstration of hyperglycaemia (random plasma glucose more than 200 mg/dl). Table 19.15 shows the cut off levels of plasma glucose used for diagnosis of DM, while doing oral glucose tolerance test (GTT)—after glucose dose of 1.75 g/kg of ideal body weight (maximum 75 g).

- Patients during DKA have moderate to severe dehydration with plasma glucose levels usually more than 300 mg/dl, metabolic acidosis, ketonuria and various electrolyte disturbances.

Table 19.12. Diagnostic criteria for impaired glucose tolerance and diabetes mellitus

Impaired glucose tolerance (IGT)	Diabetes mellitus (DM)
Fasting glucose 110-125 mg/dl	*Symptoms of DM plus random plasma glucose ≥ 200 mg/dl
2 h plasma glucose during the OGTT <200 mg/dl but ≤ 140 mg/dl	or Fasting plasma glucose ≥ 126 mg/dl Or 2 h plasma glucose during the OGTT [#] ≥ 200 mg/dl

*Symptoms include polyuria, polydipsia & unexplained weightloss with glycosuria and ketonuria

[#]OGTT Oral glucose tolerance test

Treatment

Nonpharmacological

Diet. Regularity of eating pattern is very important so that diet and insulin dosing is synchronized.

- General nutritional guidelines are followed.
- Calorie mixture should have 55% carbohydrates, 30% fat and 15% proteins.
- Avoid carbohydrate with refined sugars to prevent metabolic swings. Carbonated drinks should be of sugar free variety.
- Fats derived from animal sources to be reduced and should be replaced by fats of vegetable origin.
- Calorie intake should be split as 20% breakfast, 20% lunch, 30% dinner and 10% each for 3 snacks at mid morning, mid afternoon and evening.

Physical activity and fitness. Usual exercises advised to diabetic children and adolescents include vigorous walking, jogging, swimming, tennis, etc. Though, diabetics can undertake any exercise, but unusual exercise may require modification in

insulin dosing. For the schedule day of unusual exercise, insulin dose may be reduced by 10-15%.

Pharmacological

Initial therapy. Treatment is initiated in the hospital with fast acting (regular) insulin.

At the onset of DM (or after recovery from DKA), the dose of insulin is 0.5-1.0 unit/kg/day.

Inj. Regular insulin 0.1-0.25 units/kg subcutaneous injections are given 6-8 hourly before meals.

Simultaneous blood glucose level monitoring is done. One to two days therapy is required to find out total daily insulin requirement. Once the patient stabilizes on 6 hourly insulin injections, the patient is switched over to "2 daily injections" schedule.

In "2 daily injections" schedule, the insulin is administered as follows:

- Combinations of intermediate acting (usually lente) insulin and fast acting (regular) insulin in the ratio of 2-3:1. Two-thirds of total daily-dose is injected before breakfast and one-

third before dinner. Each injection has combination of both types of insulin, e.g. total dose of insulin is 30 units—20 units (14 units lente and 6 units regular) are injected before breakfast and 10 units (6 units lente and 4 units regular) are injected before dinner.

- Blood glucose levels are monitored before each meal and the dose of insulin adjusted accordingly. Blood glucose levels should ideally be 80 mg/dl fasting and 140 mg/dl after meals (acceptable range between 80-240 mg/dl). Early morning 3 AM blood glucose level should be more than 70 mg/dl.

Modification in the insulin doses

Modification in the insulin doses will be required depending upon the blood glucose levels (Table 19.16).

- Any increase or decrease in insulin dose is by 10-15%. Generally not more than 6 units.
- After initial stabilization, newly diagnosed cases may have gradual decline in insulin requirement even up to 0.5 units/kg/day. This may persist for several weeks to several months.
- Decrease total dose of insulin by 10% at the time of discharge from hospital as the increased activity at home will decrease the insulin requirement.

Assessment of diabetic control or response to therapy

- Blood glucose estimation should be done before each meal and at bedtime in the first few weeks after diagnosis. After stabilization, it can be reduced to twice a week.
- Periodically blood glucose estimation at 3-4 AM is required to detect early morning hypoglycaemia.
- Urine for sugar is also monitored initially 3-4 times daily before meals. This can be done less frequently after initial few weeks, preferably on the days when blood sugar is not done.
- Urine for ketones once daily should be done.
- Glycosylated haemoglobin (HbA1C) estimation—once every 3 months. - HbA1C goals are: 0-6 years < 8.5% (but > 7.5%); 6-12 years < 8%; 13-19 years < 7.5%.
- Serum lipids—cholesterol, HDL, LDL, VLDL, triglycerides and urine for protein should be done once every year. Serum cholesterol should be less than 200 mg/dl, LDL less than 130 mg/dl and triglycerides less than 140 mg/dl.
- Thyroid function tests should be done once every year to detect concomitant hypothyroidism.

(For management of hypoglycaemia and diabetic ketoacidosis see also Chapter 11 on Hormonal Disorders).

Table 19.13.Modification in insulin doses

Time and blood glucose	Type and time of insulin modified
High fasting blood glucose	Evening lente insulin is increased by 10%
High noon blood glucose	Morning regular insulin is increased by 10%
High predinner blood glucose	Morning lente insulin is increased by 10%
High prebedtime blood glucose	Evening regular insulin is increased by 10%
Low fasting blood glucose	Evening lente insulin is decreased by 10%

Time and blood glucose	Type and time of insulin modified
Low noon blood glucose	Morning regular insulin is decreased by 10%
Low predinner blood glucose	Morning lente insulin is decreased by 10%
Low prebedtime blood glucose	Evening regular insulin is decreased by 10%

Blood sugar monitoring, maintaining the records of treatment and sugar levels.

Adherence to diet.

Regular exercise.

Recognizing the symptoms of hypoglycaemia and its home management.

(See also Diabetes Mellitus in Chapter 11).

References

1. Diabetes Mellitus. In: Nelson's Textbook of Paediatrics. Behrman RE, Kliegman RM, Jenson HB (eds), 19th Edition, WB Saunders Co, 2011; pp 1968-1977.
2. International Guidelines for Paediatric and Adolescent Diabetes (ISPAD) Consensus Guidelines, 2000.
3. Standards of Medical Care in Diabetes 2006. American Diabetes Association: Clinical Practice Recommendations. Diabetes Care 2006; 29: Suppl 1:54-42

HYPOTHYROIDISM

Causes

- Congenital hypothyroidism - aplasia, hypoplasia or ectopia of thyroid gland.
- Acquired hypothyroidism - iodine deficiency, lymphocytic thyroiditis and following irradiation of cervical region for malignant disorders.

Clinical features

Congenital –

- Prolongation of physiological jaundice and
- Feeding difficulty in the form of sluggishness and choking
- Infants cry less, sleep more and have constipation, abdominal protuberance and umbilical hernia.

Infants with these features should be screened by thyroid function tests to avoid delay in diagnosis. Gradually, the features of physical and mental retardation become more obvious which can be severe.

Diagnosis is based on demonstration of low serum T4. Serum T3 levels may be normal and are not useful for diagnosis. In primary hypothyroidism, TSH is elevated. Radionuclide scans are not essential for diagnosis but help to delineate the exact aetiology.

Treatment

Pharmacological

Initiation of therapy.

L-thyroxine (Tab. 50 and 100 mcg).

Initial dose in neonatal period is 10-15 mcg/kg/day (usually 37.5-50 mcg per day), given as a single daily dose half an hour before food. The tablet can be crushed and mixed in expressed breast milk or any other liquid for small infants.

Treatment is required life long and the requirement keeps changing with increasing age. In later part of infancy, dose decreases to 5-6 mcg/kg/day then to 3-4 mcg/kg/day

in children and the adult dose is 2 mcg/kg/day.

Reference

1. Hypothyroidism. In: Nelson's Textbook of Paediatrics. Behrman RE, Kliegman RM, Jenson HB (eds), 19th Edition, WB Saunders Co, 2011; pp 1895-1903.

URINARY TRACT INFECTION (UTI)

Urinary tract infection (UTI) is a common bacterial infection in infants and children.

Risk of UTI is higher in children with congenital urinary tract anomalies, chronic diarrhoea and malnutrition.

Clinical Features

Symptoms are nonspecific. In neonates, it presents as a part of septicaemia, in infants and young children with fever, diarrhoea, vomiting, pain and poor weight gain.

Older children may have burning, urgency, frequency, flank pain, turbid urine and recent onset enuresis. Diagnosis is confirmed by growth of significant number of organisms of a single species in the urine (Table 19.17).

Table 19.14. Interpretation of urine culture

Method of collection	Colony count	Probability of infection
Suprapubic aspiration	Urinary pathogen in any number	99%
Urethral catheterization	$>50 \times 10^3$ CFU/ml	95%
Mid stream clean catch	$>10^5$ CFU/ml	90-95%

CFU: colony forming units.

Definitions

Significant bacteriuria: Colony count of $>10^5$ /ml of a single species in a midstream clean catch sample.

Asymptomatic bacteriuria: Presence of significant bacteriuria on two or more specimens in a child with no symptoms.

Recurrent UTI: Second attack of UTI.

Complicated UTI: Presence of fever $>38.5^\circ\text{C}$, toxicity, persistent vomiting, dehydration and renal angle tenderness.

Simple UTI: UTI with low grade fever, dysuria, frequency, urgency but none of the above symptoms.

Treatment

Nonpharmacological

Maintain adequate hydration and encourage liberal fluid intake to alleviate dysuria

(Note: Alkalinization of urine is not necessary).

Pharmacological

Therapy should be started after obtaining urine culture.

Complicated UTI and/or age less than 3 months

1. Inj. Ampicillin 100 mg/kg/day IV in 3 divided doses for 10 to 14 days.
2. Inj. Gentamicin 5-6 mg/kg/day in 2 divided doses for 10 to 14 days.

Or

Inj. Cefotaxime 100-150 mg/kg/day IV in 3 divided doses for 10 to 14 days.

Or

Inj. Ceftriaxone 75-100 mg/kg/day IV in 1-2 divided doses for 10 to 14 days.

If age more than 3 months only Inj. Gentamicin can be given.

Uncomplicated UTI and age >3 months

Syr. Amoxycillin 30-50 mg/kg/day in 3 divided doses for 7 to 10 days.

Or

Syr. Cotrimoxazole (Trimethoprim) 6-10 mg/kg/day in 2 divided doses for 7-10 days.

Or

Syr. Cephalexin 50-70 mg/kg/day in 3 divided doses for 7-10 days.

(**Caution:** Quinolones should be avoided as firstline medication; their use should be guided by results of culture and sensitivity test)

Nalidixic acid or Nitrofurantoin should NOT be used to treat UTI in young infants since they do not achieve therapeutic concentration in renal parenchyma and bloodstream.

Monitoring

An abdominal ultrasound examination and repeat urine culture are necessary in patients who fail to show clinical response (reduction of fever and toxicity) within 48 hours of initial treatment.

Workup of a case of first UTI is shown in Fig. 19.4.

Child with more than one episode should be worked-up for cause of recurrent UTI. Each episode is treated as mentioned above but child should be investigated in detail with ultrasound, MCU and DMSA scan and prophylaxis for recurrence as in Tables 19.18 and 19.

Table 19.15. Antimicrobials for prophylaxis of UTI

Drug	Dose (mg/kg/day)	Remarks
Cotrimoxazole Nitrofurantoin	1-2 (trimethoprim) 3 mg	Avoid in infants <3 months age and G-6PD deficiency Gastrointestinal upset; avoid in infants <3 months age, G-6PD deficiency and renal insufficiency
Cephalexin	10	Drug of choice in first 3-6 months of life

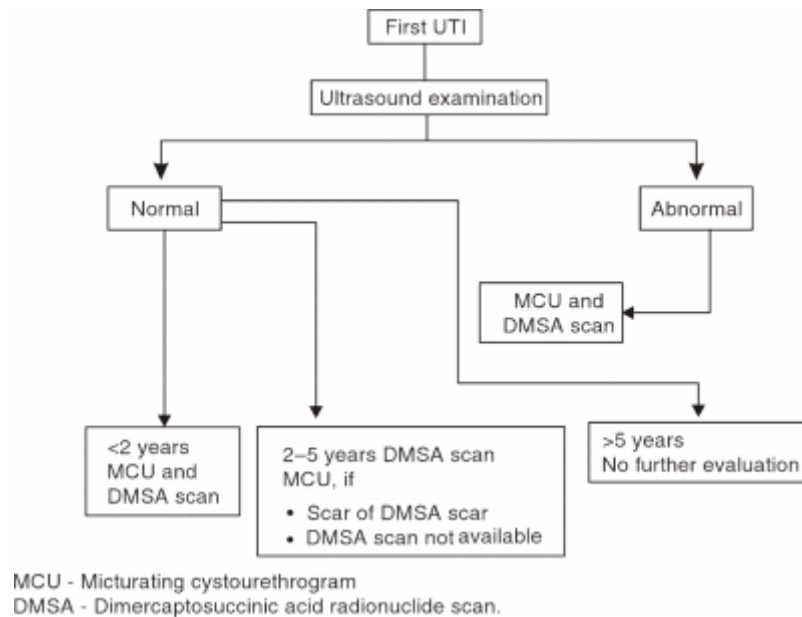


Fig.19.3. Workup of cases of first UTI.

Table 19.16. Indications and duration for antimicrobial prophylaxis

Findings	Age	Duration
First UTI	All	Till 5 years of age*
Reflux and renal scar present	All	Six months and re-evaluate**
No reflux but renal scar	<2years	Six months and re-evaluate**
Noreflux, norenalscar	>2years	No prophylaxis
Recurrent UTI (without reflux or scar)	All	Six months

* Child >5 years of age at initial evaluation prophylaxis for 12-18 months, re-evaluate

**DRCG/MCU to look for vesicoureteric reflux (VUR), which might have been missed on initial evaluation.

Prophylaxis is stopped, if VUR is not detected.

Note: Grade IV (bilateral) and Grade V—prophylaxis given up to 1 year, then surgery is indicated.

Reference

1. Consensus Statement on Management of Urinary Tract Infections. Indian Paediatric Nephrology Group, Indian Academy of Paediatrics. Indian Paediatrics 2001; 38: 1106-1115.

(See also Urinary Tract Infection in Chapter 10).

ACUTE GLOMERULONEPHRITIS (POST-STREPTOCOCCAL)

It follows streptococcal infection of throat or skin by 1-2 weeks.

Disease is self-limiting and generally resolve in one month; however, microscopic urinary changes may persist up to one year.

Clinical Features

- Sudden onset of gross haematuria, proteinuria, oedema, hypertension, oliguria and other features of renal insufficiency.
- Complications like congestive heart failure or encephalopathy may occur in a few patients.

Diagnosis

- Clinical
- Urine showing RBCs, WBCs and mild proteinuria.
- Serum C3 level are low.
- Serum ASLO titres are elevated in most patients of post-streptococcal glomerulonephritis (PSGN) (up to 90%).

Treatment

Child should be admitted for monitoring and treatment, if complications occur.

Nonpharmacological

Routine activity need not be restricted unless features of acute renal failure or severe hypertension occur.

Diet is restricted like in acute renal failure.

Pharmacological

There is no specific treatment.

Treatment of hypertension:

Inj. Frusemide (40 mg) 1-2 mg/kg/day in 2 divided doses till oliguria lasts.

Cap. Nifedipine 0.25 mg/kg SOS.

Inj. Procaine penicillin 4 lac units once daily, if evidence of sore throat or skin infection.

Reference

1. Glomerulonephritis associated with Infection. In: Nelson's Textbook of Paediatrics. Behrman RE, Kliegman RM, Jenson HB (eds), 19th Edition, WB Saunders Co, 2011; pp. 1703-1786.

NEPHROTIC SYNDROME (NS)

Nephrotic syndrome is an important chronic disorder in children. It can be

- Primary-idiopathic
- Secondary- SLE, Henoch-Schonlein purpura, amyloidosis, etc.

Clinical Features

- Heavy proteinuria,
- Hypoalbuminaemia (S. Albumin <2.5 g/dl),
- Hyperlipidaemia (S.cholesterol >200 mg/dl)
- Oedema.

Investigations

- Dipstick or heat coagulation of urine shows 3+/4+ proteinuria.

- Spot protein/creatinine ratio > 2 mg/mg or urine albumin excretion > 40 mg/m²/h (on a timed sample).
- Estimation of blood levels of antistreptolysin O and C3 in patients with gross or persistent microscopic haematuria.

Investigations which help in diagnosis and management are urine analysis, blood counts, S. cholesterol, S. proteins, blood urea, S. creatinine, urine culture, X-ray chest, Mantoux, HBsAg.

Treatment

Treatment of steroid sensitive nephrotic syndrome without hypertension, haematuria and azotaemia is shown in Figure 19.5.

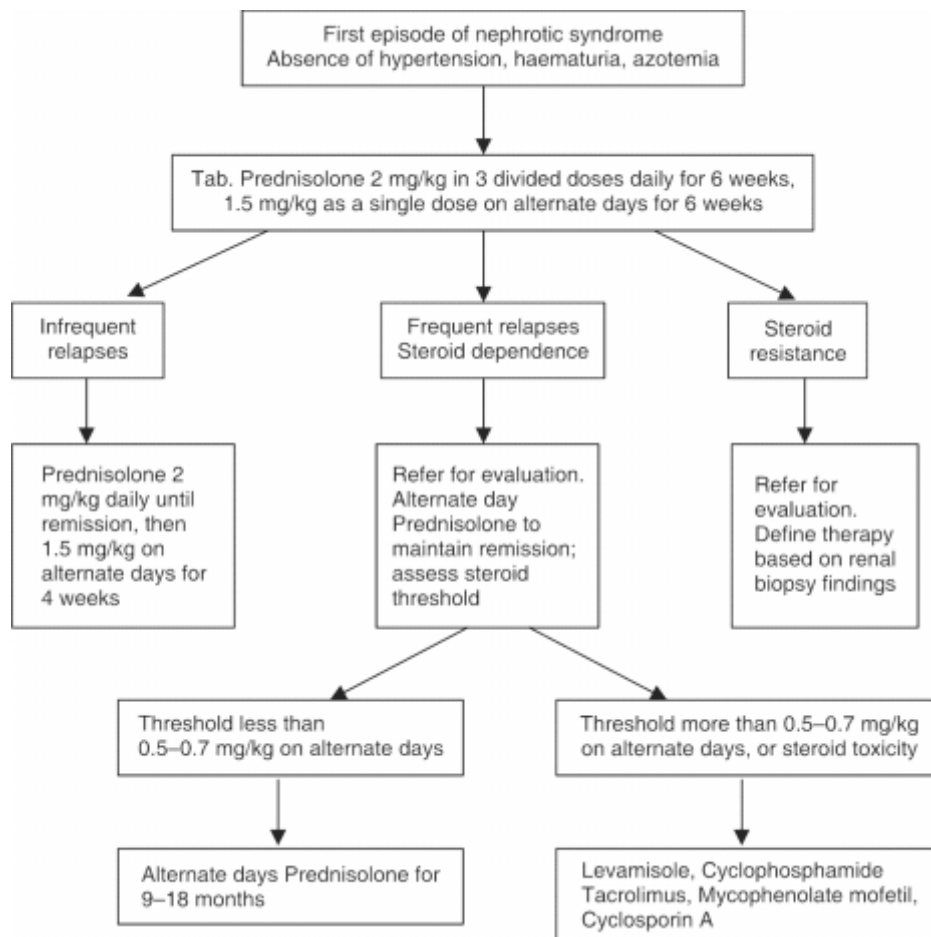


Fig. 19.6. Treatment of steroid sensitive nephrotic syndrome without hypertension, haematuria and azotaemia.

Definitions useful for guiding treatment are as follows:

Remission: Urine albumin nil or trace (or proteinuria <4 mg/m²/h) for 3 consecutive early morning specimens.

Relapse: Urine albumin 3+ or 4+ (or proteinuria >40 mg/m²/h) for 3 consecutive early morning specimen having been in remission previously.

Frequent relapses: Two or more relapses in initial 6 months, or more than three relapses in any 12 months.

Steroid dependence: Two consecutive relapses when on alternate day steroids or within 14 days of its discontinuation.

Steroid resistance: Absence of remission despite therapy with 4 weeks of daily prednisolone in a dose of 2 mg/kg per day.

Nonpharmacological

- Avoid saturated fats; not more than 30% calories should be derived from fats.
- Adequate proteins (1.5-2 g/kg), and salt restriction (1-2 g/day) only during oedema,
- Avoid extra salt.
- Good physical activity.

Pharmacological

Investigations to rule out infection, if symptomatic should be done before starting treatment with steroids, i.e. urine culture and sensitivity, Mantoux, X-ray chest, Hb, HBsAg.

Treatment of oedema

Management of oedema in patients with nephrotic syndrome is given in Fig. 19.6. Patients requiring high-dose frusemide or addition of other diuretics should be under close supervision, preferably in a hospital. Monitoring of serum electrolytes is necessary in all patients receiving diuretics. Patients showing hypokalaemia require potassium supplement or co-administration of spironolactone. The medications are stepwise once diuresis ensues.

Monitoring

1. Urine output, weight record
2. Blood pressure
3. Urine albumin daily till remission

Infection in nephrotic syndrome

1. Patients of nephrotic syndrome with positive Mantoux test but no evidence of disease should be put on INH prophylaxis for 6 months.
2. Absence of florid symptoms and signs may delay the diagnosis of serious infections like peritonitis and cellulitis in nephrotics. Systemic antibiotics should be used aggressively, if infection is suspected.

A biopsy is required to identify the underlying renal disease in certain cases (Table 19.20).

Table 19.20. Indications for kidney biopsy (to be carried out at tertiary care level)

At onset

<1 year, persistent microscopic/gross haematuria or low serum C3; sustained hypertension; renal failure not attributable to hypovolaemia; or suspected secondary causes of nephrotic syndrome.

After initial treatment

Proteinuria persisting despite 4 weeks of daily corticosteroid therapy. Before starting treatment with cyclosporine-

- A. Frequently relapsing or steroid dependent nephrotic syndrome.

Indications for referral to a higher centre (paediatric nephrologist)

Onset <1 year of age; family history of nephrotic syndrome.

Nephrotic syndrome presenting with hypertension, persistent microscopic or gross haematuria, or impaired renal function or extra-renal features (e.g. arthritis, serositis, rash).

Complications like refractory oedema, thrombosis, severe infections and steroid toxicity.

Reference

1. Management of steroid sensitive: Nephrotic Syndrome. Revised guidelines. Indian Paediatric Nephrology Group, Indian Academy of Paediatrics, Indian Paediatrics, 2008, 45: 203-214.

(See also Nephrotic Syndrome in Chapter 10).

FEBRILE SEIZURES

Febrile seizures are brief (2-5 min), generalized tonic-clonic and self-limited seizures followed by a brief post-ictal period of drowsiness, in an otherwise healthy, febrile

child of 6 months to 5 years of age, without any evidence of underlying neurological disease.

Clinical Features

Febrile seizures usually occur when the temperature is rising rapidly, to generally

39°C (102°F) or more of core temperature. They are of two types:

- (i) **Typical** (simple) febrile seizure occurs on day 1 of fever, does not last for more than 10 minutes; generalized tonic-clonic; generally not more than one episode within 24 hours.
- (ii) **Atypical or complex** febrile seizure may persist for more than 15 minutes; it could be focal in nature; more than one episode of seizure in 24 hours; associated with abnormal neurological findings or deficits. An organic cause such as an infectious or toxic process should be considered and investigated.

Late onset febrile seizures, persistent febrile seizures, generalized epilepsy and febrile seizure plus (GEFS+) and febrile status epilepticus (FSE) are part of the spectrum of febrile seizures

Investigations

Lumbar puncture: to rule out possibility of meningitis EEG - in cases with atypical febrile seizure or in a child with high risk for developing epilepsy.

High risk for developing epilepsy-

- A positive family history of epilepsy,
- Initial febrile convulsion prior to 9 months of age,
- A prolonged or atypical febrile seizure,
- Delayed developmental milestones and an abnormal neurological examination.

Treatment

Management includes definitive diagnosis, restraint in investigations, treatment of an acute episode, prophylaxis for future episodes and family counselling.

Out-of-hospital treatment

Rectal liquid diazepam (0.5 mg/kg) or buccal Midazolam (0.3 mg/kg) for acute termination of seizures that last for two minutes or more. Nasal spray of midazolam is also available.

Nonpharmacological

Clear the airway, semi-prone lateral position and oxygen therapy.

Pharmacological

In cases presenting with seizures, the mainstay of management is prompt administration of anticonvulsants.

The best drug is Diazepam/Midazolam/Lorazepam in a dose of 0.3 mg/kg by slow intravenous or rectal route. It can be repeated, if seizures do not subside (per rectal dose may be given up to 0.5 mg/kg/dose).

Intermittent prophylaxis (during febrile illness)

It is a safe and effective method of prophylaxis *but does not reduce the risk of future epilepsy*.

Tab Clobazam 0.75 mg/kg for 2-3 days in 2 divided doses during fever

Or

Tab/Syr. Diazepam 0.3 mg/kg/dose every 8 hours (1 mg/kg/day) for 2-3 days of febrile illness, started on the day of onset of fever. Dose can be adjusted, if over sedation or ataxia noted.

Continuous prophylaxis

Febrile status, complex and recurrent febrile seizures (>6/year in spite of intermittent prophylaxis) may need EEG, neuroimaging and continuous prophylaxis with AED. Phenobarbitone and valproate may be used in infants and older children, respectively, for 1-2 years. Carbamazepine and phenytoin are not useful.

(See also Epilepsy in chapter 1)

References

1. Febrile Seizures. In: Nelson's Textbook of Paediatrics. Behrman RE, Kliegman RM, Jenson HB (eds), 19th Edition, WB Saunders Co, 2011; pp 2017-2019.
2. Facility Based IMNCI (F-IMNCI) Participants Manual. WHO, UNICEF, and Ministry of Health & Family Welfare, Government of India, 2009.

NEUROCYSTICERCOSIS

Neurocysticercosis (NCC) is the disease produced by invasion of the CNS by the cystic stage (cysticercus) of pork-tapeworm (*Taenia solium*). In humans, the disease is acquired by ingestion of contaminated food or water with the eggs of *Taenia solium*.

Clinical Features

- Asymptomatic
- Neurologic, cognitive or personality disorder
- Seizures, either focal or generalized
- Meningeal irritation,
- Hydrocephalus or increased intracranial tension.
- Decreased visual acuity may be seen in ocular cysticercosis.
- Spinal neurocysticercosis-evidence of cord compression, nerve root pain, transverse myelitis, or meningitis.

Diagnosis

- CT and MRI- the presence of an eccentric scolex in a cystic lesion is pathognomic of an NCC. Cystic lesions with or without enhancement and calcifications are the commonest findings. Serologic tests
- ELISA or immunoblot are also done.

Treatment

Pharmacological

1. In live NCC cysts and transitional NCC granuloma, Tab. Albendazole 15 mg/kg/day in 2 doses per day for 7 days or 28 days in dose of 15 mg/kg, taken with fatty meals.
(**Caution:** Cysticidal drugs are absolutely contraindicated in ophthalmic lesions; perform fundoscopy before use of cysticidal drugs; monitor patients carefully for development of raised ICP.)
Tab. Prednisolone 1-2 mg/kg/day started 2-3 days prior to cysticidal drugs and continued for 5-7 days to reduce the risk of cerebral oedema at the time of cyst breakdown.
2. Anticonvulsants, such as carbamazepine or phenytoin should be used in appropriate doses to control the seizures. An optimum duration of therapy has not been settled. However, a seizure free interval for even one year may be taken as indication to taper off the therapy (for details see section on Epilepsy and Status Epilepticus).
3. Corticosteroid: Use of corticosteroid is limited to following category of patients only:
 - i. Patients who develop signs of increased intracranial tension during treatment.
 - ii. Large subarachnoid cysts (these cases have risk of developing cerebral infarcts due to occlusive endarteritis).
 - iii. Encephalitis like features.
 - iv. Cysticercal angitis.

Surgical treatment

1. A ventricular shunt must be placed, if there is evidence of hydrocephalus. This should precede the medical treatment.
2. Surgical intervention is also required for removal of large solitary cyst for decompression, removal of mobile cysts causing ventricular obstruction, and some cases that fail to respond to medical therapy (spillage of cyst contents is not seen in these cases as is seen in cases of echinococcosis).
3. Ocular cysticercosis should be treated surgically only; enucleation is frequently required.

References

1. Cysticercosis. In: Nelson's Textbook of Paediatrics. Behrman RE, Kliegman RM, Jenson HB (eds), 19th Edition, WB Saunders Co, 2011; pp. 1234-1237.
2. Guidelines for the Diagnosis & Management of Childhood Epilepsy. Indian Pediatrics 2009; 46: 681-698.

(See also Neurocysticercosis in Chapter 9).

ACUTE MENINGOENCEPHALITIS

Acute meningoencephalitis is an acute inflammatory process involving meninges and

brain tissue, due to infection by viruses and bacteria.

Clinical Features

- Fever,
- Headache,
- Vomiting,
- Irritability,
- Altered state of consciousness,
- Signs of meningeal irritation
- Seizures.

CSF examination differentiates the viral from bacterial cause of acute meningoencephalitis (Table 19.21).

Table 19.17. CSF findings in meningoencephalitis

	Pressure (mmH ₂ O)	Leucocytosis (mm ³)	Protein (mg/dl)	Glucose (mg/dl)
Normal	50-80	<5, >75% Lymphocytes	20-45	>50 or 75% Serum glucose
Acute bacterial meningitis	Usually elevated (100-300)	100-10,000 PMN's* predominate	100-500	Decreased (<40)
Acute viral meningoencephalitis	Normal or elevated	Rarely >1000 PMN's early but Lymphocytes predominate in the most of the course	50-200	Normal rarely decreased
Tubercular meningoencephalitis	Usually elevated	100-500 PMN's early but later lymphocytes predominate	100-3000	<50

*PMN's = Polymorphonuclear leucocytes

Treatment

Supportive treatment is the mainstay of therapy and is started immediately.

1. Maintain airway, breathing and circulation.
2. Control of seizures with IV injection of Diazepam 0.2 to 0.4 mg/kg stat followed by Inj. Phenytoin 10-20 mg/kg stat followed by 5 mg/kg/day in divided doses.
3. Increased intracranial tension is treated by proper positioning of patient with head elevated at 15-30° position, fluid restriction to 2/3rd of maintenance, 20% Mannitol 5 ml/kg over 10-15 min followed by 3 ml/kg every 6 hourly for 48 hours and then SOS.

Or

Acetazolamide 50-75 mg/kg/day in 3 divided doses through feeding tube

Or

Glycerine 1 ml/kg/day through feeding tube may be added, if increased intracranial tension persists.

4. Fever is controlled as given in section on fever.

(**Caution:** Never give aspirin).

5. The intravenous fluid at two-thirds of the maintenance requirement initially. The electrolyte concentration of the blood is monitored very closely. Any imbalance is treated promptly. Fluid restriction is not done, if patient is dehydrated or is in shock.
6. Feeding: Initially the patient is kept nil orally for first 24-48 hours. Later on the feeding is guided by the level of sensorium. A tube feeding is helpful for feeding as well as for giving medicines.

Specific treatment

Until a bacterial cause is excluded, parenteral antibiotic therapy should be administered.

The choice of antibiotics depends upon age of the patient and prevalence of organism in the area.

Age 0-3 months

1. Inj Cefotaxime 200 mg/kg/day IV in 4 divided doses for 14 days .
2. Inj Ampicillin 300 mg/kg/day IV in 4 divided doses for 14 days.

Age 3 months-12 years

1. Inj Ceftriaxone 100 mg/kg/day IV over 30-60 minutes in 2 divided doses for 10 days
Or
Inj Cefotaxime 200 mg/kg/day IV in 3 divided doses for 10 days
Or
Inj Ampicillin 300 mg/kg/day IV in 4 divided doses for 10 days
2. Inj Chloramphenicol 100 mg/kg/day in 4 divided doses for 10 days If *Meningococci* is suspected/isolated, Inj Penicillin G 300,000-400,000 IU/kg/day in 4 divided doses for 7-10 days.

Viral meningoencephalitis

Herpes simplex virus (generally diagnosed by focal encephalitis or CT scan):

Inj Acyclovir 30 mg/kg/day in 3 divided doses for 14-21 days. Non-HSV viral encephalitis is treated by supportive therapy only.

Lumbar puncture is repeated at 48 hours to see the response. However, if the patient is improving well, a repeat lumbar puncture may not be necessary.

References

1. Central Nervous System Infections. In: Nelson's Textbook of Paediatrics. Behrman RE, Kliegman RM, Jenson HB (eds), 19th Edition, WB Saunders Co, 2011; pp. 2086-2098.
2. Facility Based IMNCI (F-IMNCI) Participants Manual. WHO, UNICEF, and Ministry of Health & Family Welfare, Government of India, 2009.

(See also Encephalitis in Chapter 9).

TUBERCULOUS MENINGITIS

Tuberculous meningitis is the inflammation of meninges due to lymphohaematogenous spread of the primary infection of tuberculosis to the meninges.

Clinical Features

Clinical progression of tubercular meningitis (TBM) can be divided into three stages.

- **1st stage-** typically lasts 1-2 weeks, characterized by non-specific symptoms, such as fever, headache, irritability, drowsiness and malaise. Focal neurologic signs are absent.
- **2nd stage** - lethargy, neck-rigidity, seizures, positive Kernig or Brudzinski signs, hypertonia, vomiting, cranial nerve palsies and other focal neurologic signs.
- **3rd stage** - coma, hemiplegia or paraplegia, hypertension, decerebrate posturing, deterioration of vital signs, and eventually, death.

Complications: Survivors may have motor deficits, cranial nerve deficits, mental retardation, learning disabilities, seizures, hydrocephalus, blindness, deafness and diabetes insipidus.

Diagnosis

- CSF -lymphocytic leucocytosis with elevated protein and a low sugar (for details see Table 19.21 in section on Meningoencephalitis).
- Demonstration of AFB in CSF confirms the diagnosis, but the yield is very poor.
- Culture of CSF shows growth of *M. tuberculosis*, takes too much time.
- Positive tuberculin skin test corroborates the diagnosis but may be negative in severely malnourished/disseminated disease.
- Chest radiograph- may show primary disease
- CT scan or MRI can show exudates in the basal cisterns of brain, periventricular ooze and hydrocephalus. Some may show tuberculomas even.

Treatment

Nonpharmacological

- Nutrition- same as in PEM
- Skin care and prevention of bedsores.
- Care of bowel and bladder.
- Physiotherapy and occupational therapy should be instituted early to prevent deformities and contractures.

Pharmacological

1. Appropriate fluid therapy to correct dehydration due to frequent vomiting and decreased oral intake.
2. Treatment of SIADH. Fluid restriction to 3/4th or 2/3rd of maintenance. Treatment of raised intracranial tension
3. Inj. Dexamethasone: 0.15 mg/kg IV 6 hourly for 2 weeks followed by Tab. Prednisolone 1.5 mg/kg/day orally through feeding tube for 4 weeks. This should be tapered over another 2 weeks. A total of 6-8 weeks therapy with steroid is recommended.
4. Mannitol (20% solution) 1.5 to 2 g/kg or 8-10 ml/kg over 30-60 minutes. Repeated every 6-8 hours for 7 days. Lower doses (0.25 g/kg/dose) can also be tried.

Or

Glycerol 1 ml/kg/dose every 6-8 hours, diluted in orange juice or water, given through feeding tube. Or

Tab. Acetazolamide 50 mg/kg/day in 3 divided doses for 2-3 weeks.

5. Presence of seizures necessitates treatment with phenytoin or carbamazepine in appropriate doses (for details see section on Epilepsy in Chapter 1).

6. Specific antitubercular therapy—as given in management of tuberculosis (see section on Tuberculosis in Chapter 1).
7. Surgical treatment—ventriculoperitoneal shunt (VP shunt): TBM shows some degree of hydrocephalus by 4 weeks. Obstructive hydrocephalus should be shunted immediately. Non-obstructive hydrocephalus with increased intracranial pressure as shown by ventricular tap or CT scan will also be benefited by VP shunt. An early shunt is preferable.

References

1. Tuberculosis. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp 1340-1359.
2. RNTCP: TB in Children. Consensus Guidelines of Paediatricians, TB experts and TB Control Programme Managers, Central TB Divisions. Directorate of Health and Family Welfare, Nirman Bhavan, New Delhi, 2012.
3. Technical Guidelines for Tuberculosis Control. Central TB Division. Directorate General of Health Services, Ministry of Health and Family Welfare, Nirman Bhawan, New Delhi, 2009.
4. Mycobacterial Infections. In: Nelson's Textbook of Paediatrics. Behrman RE, Kliegman RM, Jenson HB (eds), 19th Edition, WB Saunders Co, 2011; pp 996-1016.
5. Facility Based IMNCI (F-IMNCI) Participants Manual. WHO, UNICEF, and Ministry of Health & Family Welfare, Government of India, 2009.

(see also Tuberculous Meningitis in Chapter 9).

CHAPTER 20

DENTAL CONDITIONS

TOOTH AVULSION

One of the commonest sequelae of facial trauma is tooth avulsion, exfoliation or exarticulation.

Clinical Features

- History of fall, sports injury, assault or accident. Central incisors and developing teeth are more frequently avulsed,
- Patient presents with a bleeding socket. clot in the socket and a raw wound.

Treatment

Immediately refer to a dentist.

Best result is observed if tooth is reimplanted within 5-10 minutes.

Fixation of implanted tooth with periodontal wiring, arch bar wiring or composite resin; fixation period 6 to 8 weeks; root canal treatment done after replantation only

(to avoid desiccation of periodontal ligament).

Interim storage

Best method is to place back the tooth in the socket immediately. Other storage media are saliva, milk (placed in ice since this minimizes the adverse effects on the periodontal ligament) and saline.

Pharmacological

1. Cap. Amoxycillin 250-500 mg 3 times a day for 5 days.

Or

Tab. Ciprofloxacin 250-500 mg twice a day for 5 days.

2. Tab. Ibuprofen 400 mg 3 times a day for 3-5 days.

Or

Tab. Nimesulide 100mg 2 times a day for relief of pain.

3. Inj. Tetanus toxoid (see section on tetanus).

References

1. Andreasen, J O, Andreasen, F M, Balkland L K, Flores, M T. In: Traumatic Dental Injuries – A Manual. 1st Edition, Munksgaard 1999, pp 40.
2. Cohen S, Burns R C. In: Pathways of the Pulp. 5th Edition, Mosby 1991, pp 479.

TOOTHACHE

Causes

- Caries,
- Periodontal socket,

- Abrasion,
- Attrition,
- Erosion and periodontitis.
- Maxillary sinusitis (recent bout of common cold),
- Trigeminal neuralgia
- Acute alveolar abscess

Treatment

Pharmacological

1. Cap. Amoxycillin 250 - 500 mg 3 times a day for 5 days.

Or

Tab. Ciprofloxacin 250 - 500 mg 2 times a day for 5 days.

2. Tab. Ibuprofen 400 mg 3 times a day for 3-5 days.

Or

Tab. Nimesulide 100mg two times a day for 3-5 days.

For specific treatment refer to a dentist.

Surgical

Removal of irritant like high filling and high spot on crown or bridge. Excavation of caries and sedative dressing with clove oil. Anaesthetize the tooth and extirpate the pulp (if pulp is exposed). Assess the response by getting immediate radiographs,

radiograph after 6 weeks to assess bone loss and root resorption, and clinical assessment of mobility of tooth after 6 weeks

References

1. Cohen S, Burns R C. In: Pathways of the Pulp. 5th Edition, Mosby 1991, pp. 27-28.
2. Grossman LI, Seymour O, Carlos DR. In: Endodontic Practice. 2nd Indian Reprint, Lea & Febiger 1991, pp. 26.

DENTAL ABSCESS

Patient presents with pain and swelling. The most common types of dental abscesses are periapical abscess and lateral periodontal abscess.

Periapical Abscess

Clinical Features

Severe throbbing pain, disturbed sleep, tooth is tender to touch, is extruded, mobile and may be associated with localized or diffuse swelling.

Immediate treatment

To give antibiotics as given below and refer to a dentist.

Pharmacological

Cap. Amoxycillin 250 -500 mg 3 times a day for 5 days.

Or

Tab. Ciprofloxacin 250-500 mg two times a day for 5 days.

Surgical

Drainage of pus to relieve occlusion by entering the pulp chamber. If fluctuant swelling of soft tissue is present drain by incision. Extraction or root canal treatment should be done when acute symptoms subside. Spread of infection should be closely observed to prevent complications like Ludwig's angina.

References

1. Kruger GO. In: Textbook of oral and maxillofacial surgery, 6th Edition, C.V. Mosby 1984, pp 196.
2. Grossman II, Seymour O, Carlos DR. In: Endodontic Practice 2nd Indian Reprint 1991, pp 20.

LATERAL PERIODONTAL ABSCESS

Clinical Features

- Same as in acute periapical abscess often associated with bad taste. Tooth is usually mobile and tender on tooth percussion, with associated localized or diffuse swelling of the adjacent periodontium.
- Vitality test usually positive if no associated pulpal problem.
- Radiograph shows vertical or horizontal bone loss in relation to the tooth.

Treatment

Pharmacological

1. Cap. Amoxycillin 250-500mg 3 times a day for 5 days.
2. Tab. Metronidazole 400 mg 3 times a day for 5 days.

For surgical treatment refer to a dentist for debridement of pocket and drainage of pus and irrigation with chlorhexidine. Spread of infection to be closely observed to prevent complications like Ludwig's angina.

References

1. Ramford and Ash. Periodontology and Periodontics. In: Modern Therapy and Practice, 1st Indian Edition, AITBS Publishers 1996, pp 126.
2. Mitchell D A, Mitchell L. In: Oxford Handbook of Clinical Dentistry. 2nd Edition, reprint 1996, pp 266.

DENTAL CARIES

This is a multifactorial infectious disease of hard tissues of teeth characterized by demineralization of inorganic and destruction of organic part of the tooth.

Clinical Features

Usually asymptomatic in early stages. Patient presents with tooth sensitivity and tooth ache.

Treatment

Examine for stage of caries and treat accordingly.

Nonpharmacological

In non-cavitated lesion and low risk patient with good oral hygiene practices, no treatment is given. In cavitated lesion, restoration is done.

Pharmacological

Where caries is likely to progress (in high risk patient) pit and fissure sealout.

1. Topical 2% Sodium fluoride.
2. 0.2% Chlorhexidine mouth wash twice a day.

Assessment of response to therapy

For caries active patient - follow up visit every 3 months and to check the progression of white spot on the teeth.

For normal patients - follow up every 6 months to 1 year to check the development of the white spot/cavitation.

References

1. Sturdevant CM, Roberson TM, Heymann HO, Sturdevant JR. In: The Art and Science of Operative Dentistry, 3rd Edition, Mosby 1995, pp 100-120.
2. Mitchell DA, Mitchell L. In: Oxford Handbook of Clinical Dentistry, 2nd Edition, reprint 1996, pp 28.

ADULT TYPE PERIODONTITIS

Most common dental disease includes diseases of the gum.

Clinical Features

- Swollen gums, bleeding from gums either spontaneously or on eating something hard, difficulty in chewing food, dull pain in the gums, pus discharge from gum on pressing, loosening of teeth, recession of gums.
- There is slowly progressive destruction of periodontium, loss of periodontal attachment and presence of periodontal pocket.

Treatment

Nonpharmacological

Advise brushing twice daily once after breakfast and once after dinner with super soft tooth brush for at least 3 minutes and refer to a dentist for oral prophylaxis by thorough scaling and root planing.

Pharmacological

Local therapy. 1. Rinsing with 0.2% Chlorhexidine twice daily.

2. Gel Metronidazole to be massaged on the gums twice daily.
3. Gel Chlorhexidine to be massaged on the gums twice daily.

Systemic therapy. In adults, Cap. Tetracycline 250 mg 4 times a day for 5-7 days. In children very deep pockets: Combination of drugs i.e.,

1. Tab. Ciprofloxacin 500 mg twice daily for 5-7 days.
2. Tab. Tinidazole 600 mg twice daily for 5-7 days.

Recheck the depth of periodontal pockets, if it persists, refer to a periodontist for further management.

References

1. Ramford and Ash. Peridontology and Periodontitis. In: Modern therapy and practice. 1st Indian Edition, AITBS Publishers 1996, pp 163.
2. Mitchell D A, Mitchell L. In: Oxford Handbook of Clinical Dentistry, 2nd Edition reprint. 1996, pp.212.

JUVENILE PERIODONTITIS

Common in the age group of 13-25 years characterized by rapid destruction of periodontal tissues.

Clinical Features

Mobility in incisors and molars, spacing in upper incisors, distolabial migration of upper incisors, arc shaped bone loss extending from distal surface of second premolar to medial surface of second molar.

Treatment

Pharmacological

Cap. Tetracycline 250 mg 4 times a day for 14 days.

Surgical

Extraction of badly involved teeth. Refer the patient to periodontist for further periodontal management at the earliest

Patient education

Proper brushing twice daily with super soft tooth brush.

References

1. Ramford and Ash. Peridontology and Periodontics. In: Modern theory and practice. 1st Indian Edition AITBS Publishers 1996, pp 166.
2. Carranza. In: Clinical Periodontology, 5th Edition, Saunders, pp 299.

INFLAMMATORY GINGIVAL ENLARGEMENTS

The gingival enlargement can be acute which is very painful or they can be chronic which may be painless.

Clinical Features

- Acute enlargements may be localized or generalized, very painful; deep red in colour, soft, friable, with shiny surface.
- Chronic type may be localized or generalized, often painless and slowly progressive.

Treatment

Pharmacological

1. Tab. Ciprofloxacin 500 mg 2 times a day for 3-5 days.
 2. Tab. Nimesulide 100 mg 2 times a day for 3-5 days.
 3. Rinsing with 0.2% Chlorhexidine twice daily.
- Refer to a periodontist for surgical management and drainage of pus.

References

1. Ramford and Ash. Periodontology and Periodontics. In: Modern theory and practice. 1st Indian Edition AITBS Publishers 1996, pp 145.
2. Shafer, Hine, Levy. In: A textbook of oral pathology. 4th Edition, Saunders, pp 782.

Format for Revision/Amendment of STGs

Standard Treatment Guidelines (STGs) are not intended to include treatment guidelines for each and every disease prevalent in the state. Any attempt to include every disease would defeat the purpose of the STGs (small, handy, concise, etc.) and would result into a library of books. These guidelines are intended to be comprehensive, but not exhaustive and seek to summarize information on treatment of patients presenting with priority diseases. Further, STGs cannot be a static document and would require periodic revision/updating to cope up with the emerging and changing scenario in respect of priority diseases as well as therapeutic options. Doctors are welcome to make suggestion with supporting evidence for the revision/amendment of STGs format as under:-

Please indicate the nature of suggestion by marking appropriate box and give details in the format below (Please note that suggestions not accompanied by the appropriate data /evidence may not be entertained).

- ☐ Addition of a new/priority disease to the list (Please include epidemiological data, and if possible a draft guideline).
- ☐ Replacement of a listed drug. Please indicate data/evidence on proven benefits of the indicated drug/recommended product (on the basis of efficacy, safety, suitability and/or cost effectiveness) in relation to the listed drug which is sought to be replaced.
- ☐ Inclusion of a new drug (Please include data/evidence on the benefits of such addition).
- ☐ Deletion of the listed drug (Please attach evidence of the harmful/useless effects of the drug).

(Name of the Drug (INN)/generic: Dosage form and strength: Therapeutic Class: Reason for amendment: Reference(s): Advantage over existing drug(s) in the same therapeutic class)

- ☐ Proposed treatment guidelines

Submitted by
(Name & Address)

Date

Contact : Procurement cell
Directorate Health Services, Bhopal.